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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT

A Balanced Hospital Community
Prof. THOMAS MCKEOWN, M.R.C.P. ... 701

Postoperative Metabolic Changes
Prof. W. E. ABBOTT, F.A.C.S., HARVEY KRIEGER, F.A.C.S., STANLEY LEVEY, PH.D. 704

Serum-lipids and Blood-sugar Levels in Childhood Diabetes
O. H. WOLFF, M.R.C.P., H. B. SALT, M.SC. ... 707

The Secretion of Aldosterone
A. F. MULLER, M.D., ELIZABETH MANNING, A.B., ANNE RIONDEL, ING. CHEM. ... 711

Treatment of Severe Tetanus by Curarisation and Intermittent Positive-pressure Respiration
K. J. POWELL, F.F.A. R.C.S., F. S. W. BRIMBLECOMBE, M.R.C.P., MARGARET STONEMAN, M.B. ... 713

Percutaneous Intubation of the Femoral Vein for Transfusion
DAVID VEREL, M.R.C.P. ... 716

Recurrent Facial Emphysema
J. A. BLACK, M.R.C.P., R. P. LAWRIE, M.B. ... 719

PRELIMINARY COMMUNICATIONS

The Effect of Human Growth Hormone in Man
D. IKKOS, M.D., R. LUFT, M.D., C. A. GEMZELL, M.D. ... 720

Effect of Human Growth Hormone in Hypophysectomised Diabetic Subjects
R. LUFT, M.D., D. IKKOS, M.D., C. A. GEMZELL, M.D., H. OLIVECRONA, M.D. ... 721

NEW INVENTIONS

Spirometer for Timed Capacity and Mid-expiratory Flow Measurements
S. GILLIS, M.D., B. A. BUTTERWORTH, M.R.C.P. ... 723

A Modified Foley Catheter
H. ELLIS, F.R.C.S. ... 723

SPECIAL ARTICLES

Absence from Work on a Medical Certificate
H. W. ASHWORTH, M.B. ... 732

Doctors' Pensions ... 733

British Pharmacopœia 1958 ... 734

IN ENGLAND NOW

A Running Commentary by Peripatetic Correspondents ... 738

REVIEWS

Notices of Books ... 724

LEADING ARTICLES

The Twist of the Cord ... 725
The British Pharmacopœia ... 726
Support for the Family ... 727

ANNOTATIONS

Postoperative Metabolic Changes 729
Laboratory Services in Scotland 729
The Hamman-Rich Syndrome ... 730
The Russian Vaccine ... 730
Massive Venous Occlusion ... 731
Sir Gordon Gordon-Taylor ... 731

SYMPOSIA

Anterior-pituitary Gland ... 735

MEDICINE AND THE LAW

Medical Evidence of Diminished Responsibility ... 736

Diminished Responsibility Again ... 737

Compulsory Blood-test Refused ... 737

Lung-cancer Damages Claim ... 737

PUBLIC HEALTH

Vital Statistics for 1957 ... 737

OBITUARY

Sir Alexander Russell ... 748
Ralph Ewart Jones ... 748

LETTERS TO THE EDITOR

Consultant Distribution, Waiting-lists, and Underemployed Senior Registrars (Dr. Horace Joules) ... 739

A Functional Necessity (Dr. H. B. Kidd) ... 739

Breast Cancer (Dr. George Crile, Jr.) 739

Mitral Valvotomy and Pregnancy (Dr. Richard Turner) ... 740

Modified Tracheotomy Tube (Dr. William Napier) ... 740

Infantile Gastroenteritis (Dr. I. M. Librach) ... 740

Nylon-darn Repairs of Herniæ (Mr. Herbert Haxton, F.R.C.S.) ... 741

The Doctor's Attitude to his Patient (Dr. F. M. Mallinson) ... 741

Bed Rest, Thrombosis, and Embolism (Dr. C. P. Petch) ... 741

Essential Fatty Acids, Lipid Metabolism and Atherosclerosis (Prof. Ancel Keys, PH.D., Mr. J. T. Anderson, PH.D., Dr. Francisco Grande) ... 742

Reduction of Circulating Lipids (Dr. Daniel Brunner, Mr. K. Loebl, CHEM.ING., Dr. L. E. Schindel) ... 743

Coronary-artery Disease (Dr. G. R. Fearnley) ... 743

Rectal Methylpentynol in Labour (Dr. W. L. Whitehouse) ... 743

Automatic Signal for Urine-collecting Bottles (Dr. J. Leurer) ... 744

No Peace for the Patient (Miss Valerie Frazer) ... 744

P.A.S. and the Patient (Dr. W. M. Dixon, Dr. Peter Stradling, Dr. I. D. P. Wootton) ... 744

A Low-resistance Respiratory Valve (Dr. D. J. C. Cunningham) ... 745

Lung Resection for Bronchiectasis (Mr. K. M. Shaw, F.R.C.S.I.) ... 745

Clinical Geriatrics (Dr. John Agate; Dr. T. H. Howell) ... 745

5-Bromosalicylhydroxamic Acid for Tuberculosis (Prof. J. M. Robson, M.D., and others) ... 746

Fulminating Beriberi (Mr. J. E. Wasson, PH.C.) ... 746

The Law and Sterilisation (Mr. Glanville Williams, PH.D.) ... 746

Medical Supervision in Treatment of Obesity (Dr. A. G. Mullins) ... 747

Allergy to Cow's Milk (Mr. R. H. Woodcock) ... 747

PARLIAMENT

Consultants ... 748

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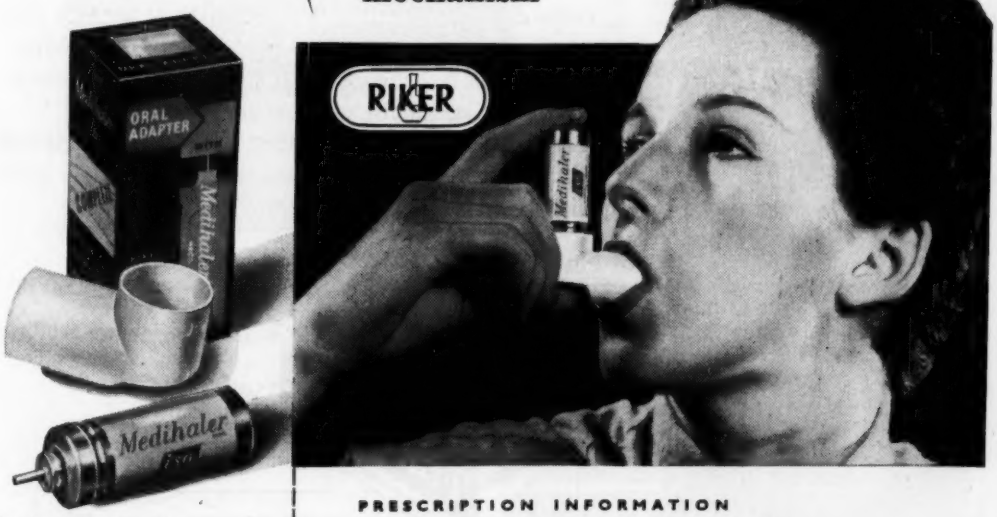

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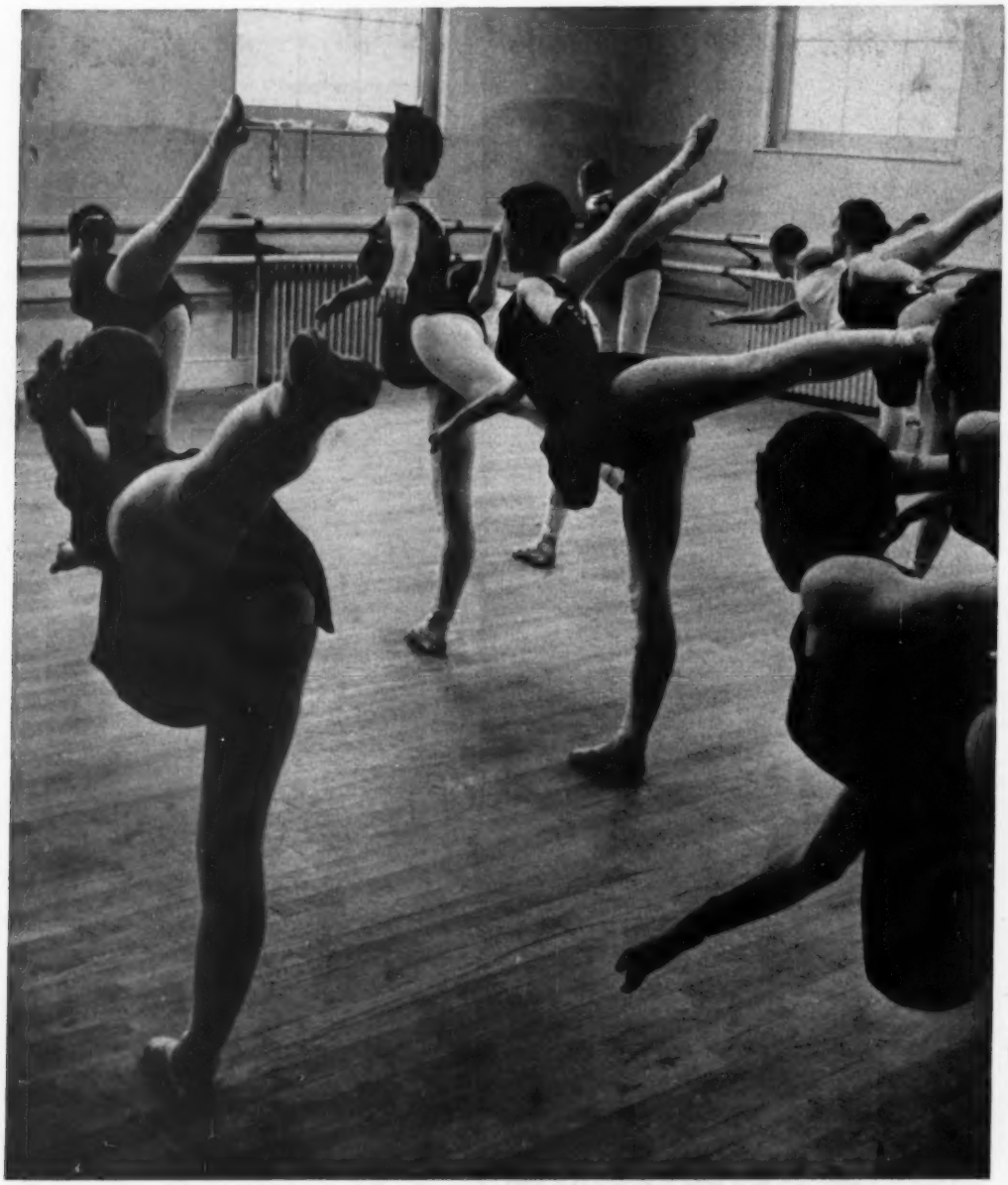

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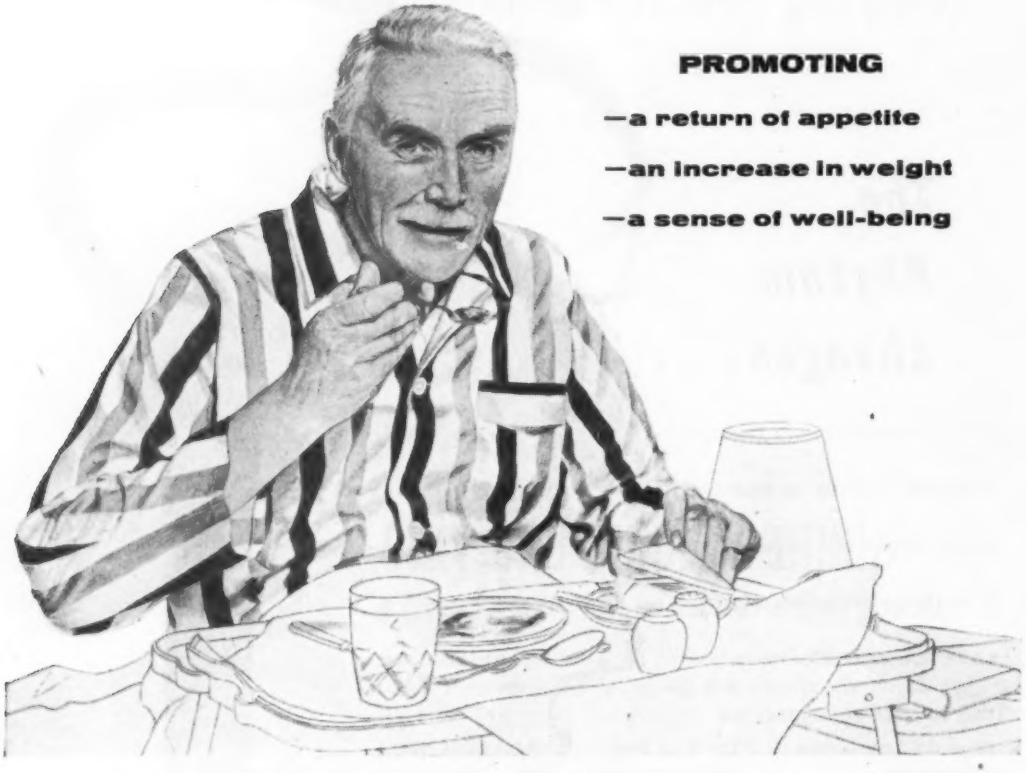

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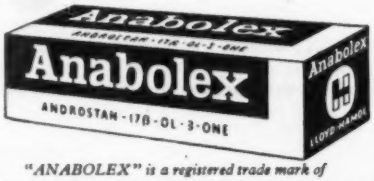

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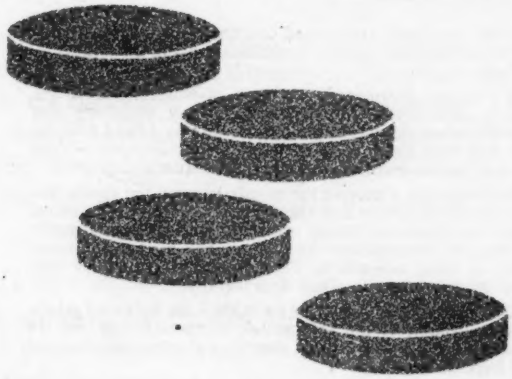

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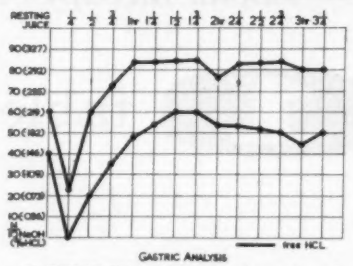

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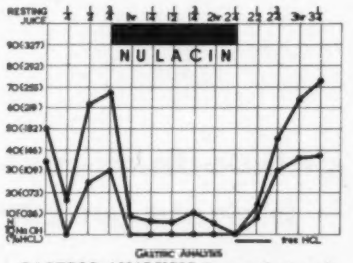

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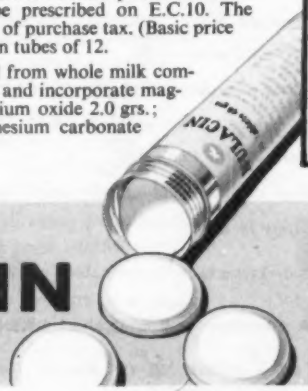

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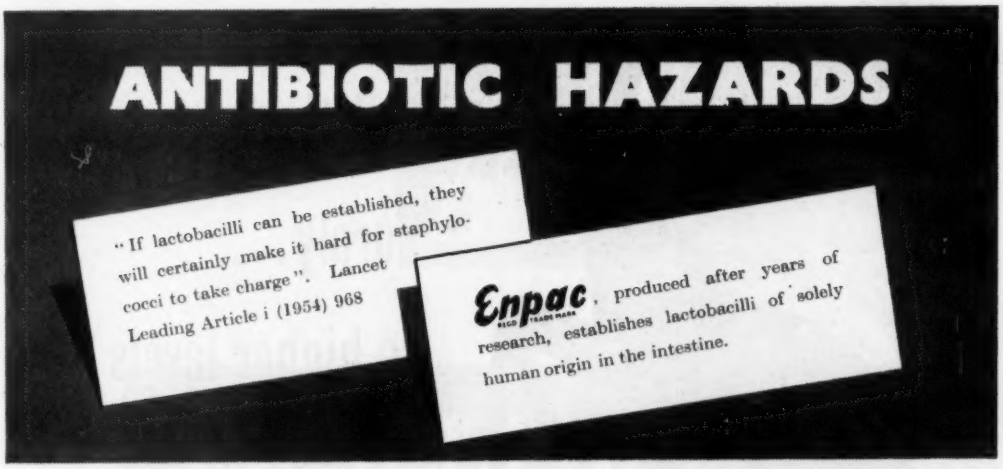
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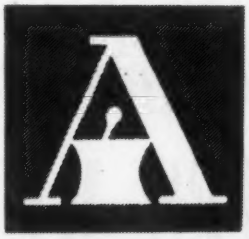

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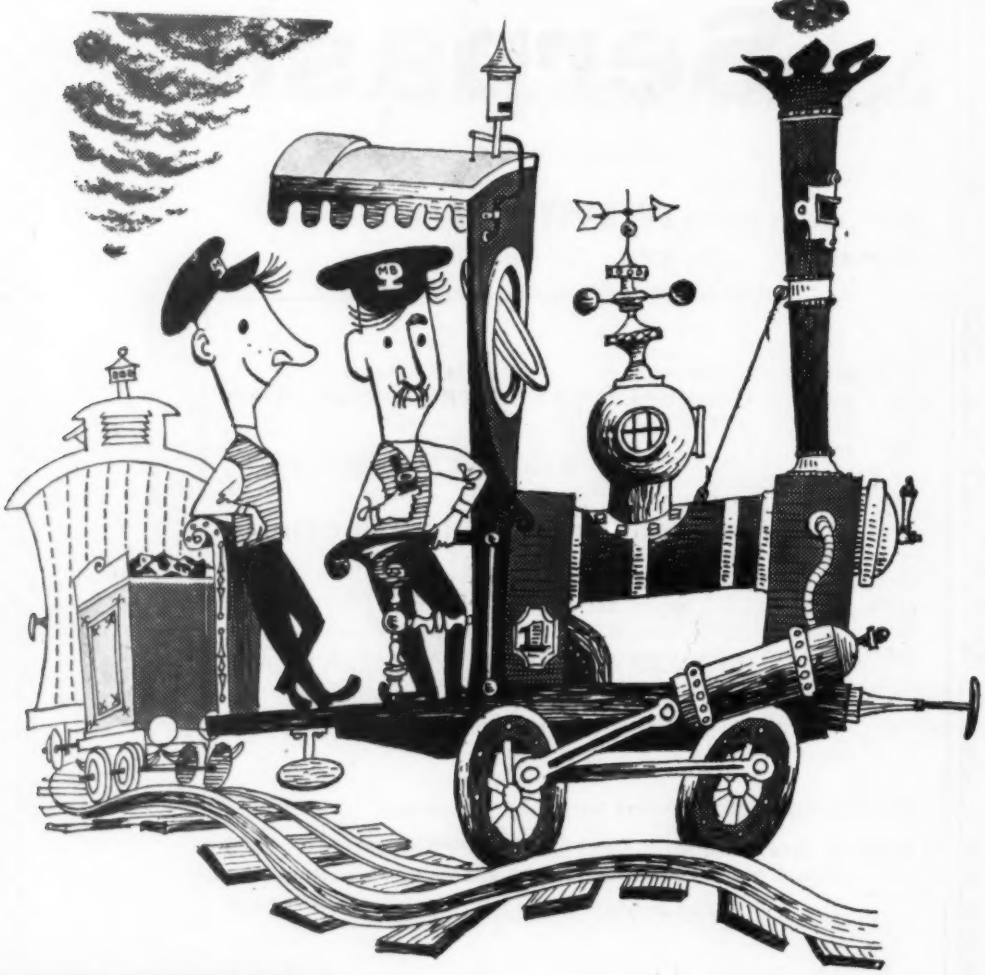

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THE CONCEPT OF A BALANCED HOSPITAL COMMUNITY

THOMAS McKEOWN
M.B. Lond., Ph.D. McGill, D.Phil. Oxon., M.R.C.P.
PROFESSOR OF SOCIAL MEDICINE, UNIVERSITY OF BIRMINGHAM

IN this paper I shall consider two firmly rooted features of our hospital tradition. One is the separation of hospitals for the chronic and mentally sick from the general hospitals. The other is the concept of hospitals as single structures, of more or less uniform design, each of which provides a full range of services. Both features owe their origin to circumstances which no longer exist, and there would be considerable advantages in getting rid of them.

The separation of hospitals for the chronic and mentally sick from the general hospital system is due to the fact that formerly various classes of patients were regarded as different problems. The infectious were to be isolated; the mentally ill were to be locked up; the chronic sick were housed with the destitute, who were to be put to work; and only in the general hospitals was the idea of investigation and treatment well established by the beginning of the present century. There was no conception of a community of sick people, differing in age or in the nature of their illnesses, but with essential medical, nursing, and social requirements in common. In these circumstances it was inevitable that the various classes of patients should be placed in different buildings, often separated by long distances and under different administrations. The 20th century has established the principle of a common standard of care and treatment, and the National Health Service has created a single hospital administration. We have yet to break through the thought barrier which prevents us from realising that, if patients are to be separated, there is a far more satisfactory basis than their age or the distinction between a physical and a mental illness.

An inevitable consequence of the separation was the concept of a hospital as a single building providing a full range of services, rather than as a group of buildings providing complementary services. It was necessary to make hospitals, so far as possible, self-contained. In asylums and poor-law institutions the standard of care was until recently so low that this requirement had little significance; but in general hospitals it led to an attempt to assemble within every unit all the most complex resources of medicine. The general hospital has now become, in most people's eyes, the model of what a hospital should be, and attempts to improve the mental and chronic-sick hospitals are based on it.

If we ignore the various subdivisions of the general hospital system (obstetrics, pædiatrics, chest diseases, and so on), hospital organisation is still based essentially on the separation of the mentally ill, the short-term physically ill, and the long-term physically ill (identified mainly by advanced age). To some extent this division is imposed by the separation of existing buildings; but it is so deeply rooted in the tradition that it is still accepted in future planning. It is a concept which has manifest disadvantages, of which two are particularly serious. It brings within the same unit patients who need the full resources of a modern hospital and others who need only simple attention, or remain in hospital solely for social reasons. And so long as they are isolated it seems impossible to staff adequately the mental hospitals and those for the chronic sick. Indeed, so obvious are the disadvantages that small psychiatric and geriatric units are now sometimes included in general hospitals. But the full implications of the traditional separation have still to be faced.

Classification of Hospital Patients According to their Needs

Once it is recognised that the chronic sick should receive the same standard of medical care as the acute sick (or more accurately, since it is the real basis of separation, that older patients should receive the same standard as younger ones), and that patients who are mentally ill need not be separated sharply from those who are physically ill, one must conclude that the type of institution in which a patient is placed should be determined primarily by his needs. An assessment of the needs of Birmingham patients in mental and chronic-sick hospitals (Lowe and McKeown 1949, Garratt, Lowe, and McKeown 1958) suggested that they could be divided broadly into four classes:

1. Patients who needed full hospital facilities, such as frequent medical attention and skilled nursing.
2. Patients who needed only limited hospital facilities—essentially simple nursing (washing, dressing, feeding, attention to bladder and bowel, &c.) without mental supervision.
3. Patients who needed only limited hospital facilities—essentially supervision because of their mental state, with (in a few cases) simple nursing.
4. Patients who needed no hospital facilities, but remained in hospital chiefly for social reasons.

The table gives the distribution between the four classes of Birmingham residents in mental and chronic-sick hospitals. In this table patients in other types of hospital are grouped together on the assumption that they require full hospital care. Actually, as was found in sanatoria (Lowe and Geddes 1952), not all of them do; but our data are not sufficient to enable us to say what the proportion is.

On this assumption, that full hospital facilities are needed by all patients in general hospitals, the percentages of Birmingham hospital patients in each of the four classes listed above are 54, 9, 31, and 6 respectively. Fig. 1 shows the present location of these patients, and fig. 2 shows the regrouping which would result from bringing together patients with similar needs.

I do not, of course, suggest that all the patients in each class have identical needs; within each class there is con-

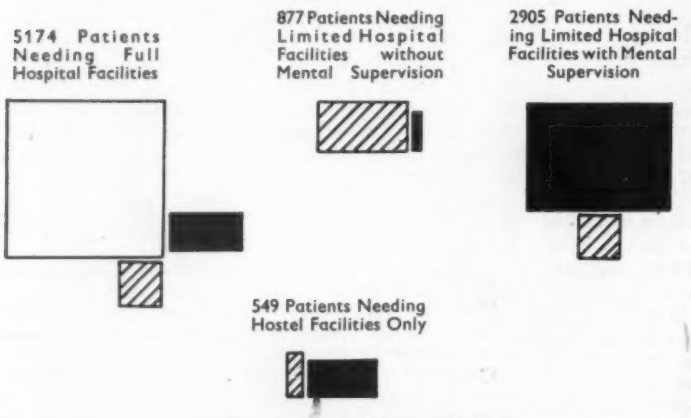
SUGGESTED REGROUPING OF BIRMINGHAM HOSPITAL PATIENTS ACCORDING TO THE TYPE OF FACILITIES NEEDED FOR THEIR CARE

Suggested regrouping of patients according to facilities needed	Present location of patients			Total	
	Mental* hospitals	Chronic-sick hospitals	General and all other hospitals	No.	%
Full hospital care ..	459	309	4406†	5174	54
Limited hospital care without mental supervision ..	59	818	—	877	9
Limited hospital care with mental supervision	2596	309	—	2905	31
Hostel only	441	108	—	549	6
Total	3555	1544	4406	9505	100

*Patients in mental-deficiency institutions are excluded.
†It has been assumed that the patients now in general and other hospitals, for whom we have no data, all need full hospital facilities.

Fig. 1—PRESENT LOCATION OF BIRMINGHAM HOSPITAL PATIENTS.

Fig. 2—SUGGESTED REGROUPING OF BIRMINGHAM HOSPITAL PATIENTS.


5174 Patients Needing Full Hospital Facilities
877 Patients Needing Limited Hospital Facilities without Mental Supervision
2905 Patients Needing Limited Hospital Facilities with Mental Supervision
549 Patients Needing Hostel Facilities Only

siderable scope for variation in type of accommodation and staff. But as regards the facilities to be provided, the division here proposed seems the most fundamental; it brings together patients who, in terms of their hospital needs, have more in common with one another than with those in any other class.

Advantages of a Common Site

So far we have been considering a regrouping of the present hospital population in order to bring together patients with similar needs. If such a regrouping were effected, the resulting four classes could be accommodated either on different sites or on a common site. I shall now consider the advantages of a common site in relation to administration, education, and research.

Administration

One of the attractions of the National Health Service is that by creating a single administration it has exposed all types of hospitals to scrutiny according to a standard formerly applied only to general hospitals. By this standard the services of mental and chronic-sick hospitals are still grossly deficient, and their deficiencies are not easily remedied. The chief difficulty is to provide enough doctors and nurses. It is conceivable that in years to come enough doctors may be forthcoming, partly because of increasing interest in psychiatry, and partly because of redundancy in other specialties. But the nursing problem is unsolved, and under present arrangements is perhaps insoluble. It derives basically from the fact that the nursing services as a whole already draw fairly heavily on the numbers of girls of a reasonable standard of education in the appropriate age-group. An effective nursing service will need both a closer adaptation of training to function, on the lines suggested in the Nuffield report (Nuffield Provincial Hospitals Trust 1953), and a more equitable distribution of nurses between the various types of hospital. In present circumstances they cannot be redistributed; for whereas a doctor who could not find a niche elsewhere might be ready to serve in a mental or chronic-sick hospital, a nurse in the same circumstances would be more likely to leave nursing.

So long as the mental and chronic-sick hospitals are separated from the general hospitals, they must depend on recruitment of nurses and doctors prepared to devote themselves exclusively to these services, and the difficulties will remain. The difficulties can, I believe, be overcome only by placing these hospitals close enough to the general hospitals to make it possible for the same staffs to serve both. Most doctors and nurses would be willing to make a contribution to the care of the mentally ill and the chronic sick if it could be reconciled with their other work, but they will not do so if it obliges them to cut themselves off completely and permanently from their main interests.

A second administrative advantage of a common site is that it would provide far greater flexibility in the use of buildings and staff. In some specialties, needs are changing rapidly, and it is almost impossible to say what they will be in ten or twenty years' time. For example, it is possible, though hardly certain, that advances in therapy and improved outpatient and domiciliary care will greatly reduce the size of the mental-hospital population.

In these circumstances it seems vital that buildings should be so sited that if they are not needed for their original purpose they can readily be converted to other uses. This is impossible so long as major sections of medical work are isolated. It would be relatively easy if they were all on the same site.

Education

To a very considerable extent the decision of doctors and nurses about their future work is determined by what they see and hear in the hospitals where they are trained. Unfortunately patients in teaching hospitals, and in the non-teaching hospitals in which schools of nursing are usually located, are very unrepresentative of the total hospital population. Inevitably students conclude that the work of general hospitals is the chief interest of doctors and nurses, and that, apart from a few eccentrics with a sense of vocation, no-one works in a mental or chronic-sick hospital if he can possibly do anything else. This interpretation cannot be altered by token visits to outlying hospitals, which are as likely to harden a determination never to set foot in them again.

To recognise this difficulty is not necessarily to question the advisability of basing training on general hospitals, or to suggest that the type of patient admitted should be changed. Indeed, if the only way in which the hospital population available for teaching purposes could be made more representative were to admit long-stay mentally ill and chronic-sick patients to the general wards,

it could well be argued that the disadvantages would outweigh the advantages. But the grouping of hospitals with complementary services on a common site is an entirely different proposal: patients would be housed in buildings designed after close examination of their needs. What is important for teaching is that the student doctor and nurse should see something much nearer to a cross-section of the whole hospital population, in circumstances in which they recognise that all types of patients are equally acceptable as a medical responsibility and interest.

Research

Confronted for the first time with the existing arrangements in research, an observer might be excused for concluding that, through some unfortunate error in casting, the ablest workers had been assigned to the easiest problems. The reasons for this situation are complex, but certainly one of them is that administrative arrangements determine what the research-worker sees; and what he sees has a considerable bearing on what interests him. A physician who admits to his wards only acutely ill people is unlikely to be much concerned with the chronic sick, and a psychiatrist preoccupied with short-term treatment or mendelian inheritance cannot be expected to think constantly about the chronic psychotic. Not least of the advantages of having all facets of medical work on a single site is that it would bring some of the thorniest and socially most important problems to the attention of the ablest workers. It can hardly be doubted that the slow advance with these problems hitherto has been partly due to their isolation.

A Balanced Hospital Community

Having considered the advantages of assembling the various elements of the hospital system on a single site we may now examine some of the implications of such a policy. I must first state the proposal as clearly as possible. What is suggested is that hospitals should be planned as a group of buildings with a common medical and nursing staff providing complementary services for all classes of patients, rather than as single buildings providing a full range of services for selected groups. The buildings would be of varied size, design, and permanence of structure, each closely adapted to the needs of the patients who would occupy them.

There can be little doubt that if architects were given the opportunity to apply to such a hospital community the imaginative treatment which has been so successful elsewhere, the results would be equally attractive. Ideally the community would not be isolated; at its centre there would be careful siting of buildings and control of traffic, but at its periphery it would merge with the neighbourhood which it served. By avoidance of large buildings, and by inclusion of other amenities—shops, amusements, and so on—a domestic rather than an institutional setting could be created. In these circumstances the analogue of the hospital would no longer be the somewhat forbidding block of flats, but the well-planned housing estate or university centre.

If this proposal is not to be dismissed as romantic and unrealistic, we must consider at least two possible objections. One is that the capital and maintenance costs would be excessive. The other is that, however attractive such a setting might be to the architect or planner, its amenities would bear little relation to the real needs of the hospital population.

It is true, of course, that a considerable capital outlay would be required to establish such a centre. But there are several reasons for thinking that in relation to the services provided the costs would be lower than those of the traditional hospitals:

(a) There would be no duplication of expensive facilities or mixing of patients with different needs.

(b) Three of the four major units (see diagram) could be of cheap construction.

(c) Because of the relatively simple conversion of unwanted facilities to alternative use, there would be little waste.

The last is a particularly important consideration in a period when numbers and types of patients may change rapidly. The trimmings which could contribute so much to the creation of a domestic atmosphere—shops, restaurants, and amusements—could operate on the usual commercial basis, and with a favourable site in relation to a large resident population there is no reason to suppose they would not do so. Nor need we suppose that maintenance costs must be excessive.

The objection that the amenities would bear little relation to the real needs of hospital patients derives from failure to appreciate the true nature of the whole hospital population. For the acutely ill bedfast patient who is retained for a few weeks, the general character of the area in which he is cared for is perhaps of secondary importance. But a substantial part of the hospital population is ambulant, and the period of admission is measured in years rather than days. It is for these patients that the character of the area and the nature of its general amenities are so important. At the very least they would provide a more attractive environment in which to spend a long period, and in the case of the mentally ill it is not too much to expect that they would make a considerable contribution to recovery.

Possibilities Where Planning is Restricted by Existing Hospitals

Another possible criticism of the idea of a balanced hospital community is that however desirable it may be, and however practicable in countries such as India or Ghana where the planner can work on a virgin site, it has little bearing on the problems of areas where planning is restricted by existing structures. In the British Isles for a long time we shall have to make do with the present hospitals, however unsuitable in design, and many of the available sites, particularly in urban areas, are so small that they could not accommodate a balanced community.

Nevertheless, though the transformation of the hospital centre may be slower than we might like, it seems essential to have in our minds a model of what it ought to be in future. For while we must accept the limitations imposed by an earlier tradition, we need not increase the difficulties by continuing to build within that tradition. Almost every major development within the service would be influenced in some degree by a decision that hospitals should no longer be planned as isolated structures of uniform design. In the planning of a general hospital, for example, it would affect both the location and size of the site, and the design of the building itself would be different if it were to accommodate those of the mentally ill and the aged sick who need the full resources of a modern hospital. It would be evident that at all costs the isolation of hospitals for the mentally sick and chronic sick should be avoided.

Summary

An analysis of the medical and nursing needs of Birmingham hospital patients showed that they could be grouped into four classes, according to whether they required: (a) full hospital facilities (54%); (b) limited hospital facilities, consisting of basic nursing without mental supervision (9%); (c) limited hospital facilities, consisting of mental supervision with little basic nursing (31%); and (d) no hospital facilities (6%).

Considerable advantages would result from planning hospitals as a group of buildings with a common medical and nursing staff providing complementary services for all classes of patients, rather than as single buildings providing a full range of services for selected groups.

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POSTOPERATIVE METABOLIC CHANGES IN RELATION TO NUTRITIONAL REGIMEN *

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PREVIOUSLY we presented evidence indicating that postoperative wasting of protein and loss of body-weight can be minimised or prevented by giving intravenously a solution containing 5% protein hydrolysate and 10% hexose in conjunction with a fat emulsion or an anabolic hormone (Abbott 1955, Abbott et al. 1953, 1955, 1957 a and b, Holden et al. 1957, Krieger et al. 1957, Levey et al. 1957). Since there is still some controversy about the use of these preparations, we have tried to obtain more conclusive data.

We believed that the relative importance of nutrition and operative trauma in influencing postoperative metabolism could be estimated by comparing the metabolic response of the patient to the same intravenous regimen during a three-day control period and subsequently during a three-day postoperative period. To restore the patients to a nutritional state comparable to that which existed before the control period they were given an adequate oral intake for three or four days before the operation. In this manner it should be possible to differentiate the metabolic alterations induced by surgical trauma from the biochemical changes resulting solely from the various nutritional regimens. The metabolic alterations were assessed by comparing the changes in weight, along with sodium, potassium, and nitrogen balance and the urinary excretion of 17-hydroxycorticoids during the three-day control and postoperative periods. Moore et al. (1955) and Steenburg et al. (1956) have stated that there is a correlation between the cumulative nitrogen balance and the urinary 17-hydroxycorticoid output for the first four postoperative days. It is also generally believed that there is an obligatory retention of water and sodium and a deficit of potassium postoperatively. The validity of these concepts was further investigated.

Methods

Eleven women and two men about to undergo an elective cholecystectomy were admitted to the metabolic division of the University Hospitals of Cleveland so that accurate observations could be made. These patients were given one of the three following regimens in the three-day control and postoperative periods:

Group A.—Three women (fig. 1) and two men (fig. 2) were given only 5% dextrose in water intravenously.

Group B.—Four women (fig. 3) were given only 5% dextrose in water to which had been added about 90 mEq. of sodium and 80 mEq. of potassium daily.

Group C.—Four women were given 5% protein hydrolysate in a 10% fructose solution † to which sodium and potassium were added to provide a daily intake of 90 mEq. of sodium and 80 mEq. of potassium.

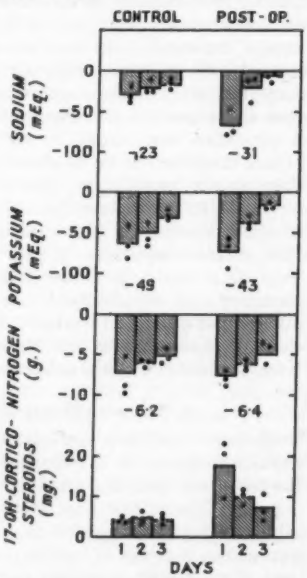

Fig. 1—Metabolic balances for sodium (mEq.), potassium (mEq.), and nitrogen (g.) and daily excretion of 17-hydroxycorticoids in 3 female patients receiving 5% dextrose in water during control and postoperative periods.

The length of the sodium, potassium, and nitrogen histograms represents average daily balance for 3 patients, and the dots represent the individual daily values for each patient. The numbers below the balance charts represent the average balance in mEq. daily for sodium and potassium and in g. daily for nitrogen in the 3 patients during the control and postoperative periods.

The intravenous infusions were started between 8 A.M. and 9 A.M. and regulated so that the patients received 500 ml. per hour. All excreta were collected and analysed for sodium, potassium, and nitrogen by methods previously described (Abbott et al. 1953). The daily urinary excretion of 17-hydroxycorticoids was determined by the method of Glenn and Nelson (1953). To determine accurately the daily changes in the body-weight the patients were weighed at 6.30 A.M. after voiding and at least eight hours after taking any food or fluids.

Results

The data obtained in studying the patients in group A (figs. 1 and 2) show that the deficits of sodium, potassium,

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† 5% 'Amigen' (enzymatic protein hydrolysate) in 10% 'Levugen' (fructose) supplied by Mead Johnson & Co.

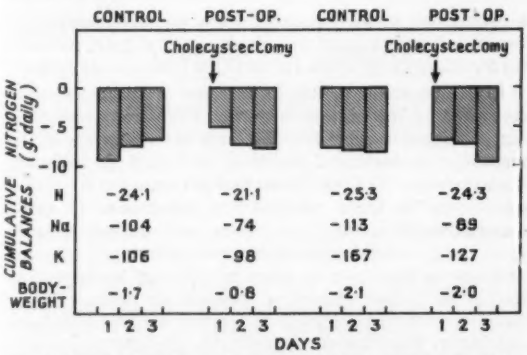
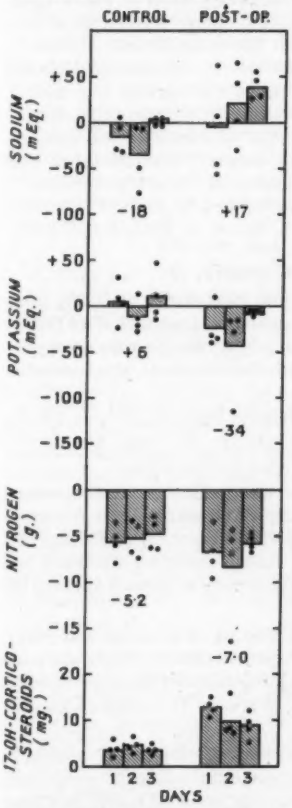


Fig. 2—Metabolic balances in 2 men, aged 75 and 67, during 3-day control and 3-day postoperative periods. Patients were given same amounts of 5% dextrose in water during both periods. Nitrogen balance (g.), cumulative 3-day nitrogen balance (g.), change in body-weight (kg.), and cumulative sodium and potassium balances (mEq.), are shown for each period.

and nitrogen were not appreciably influenced by anæsthesia and uncomplicated cholecystectomy.



The greatest sodium deficits were observed on the first day of each study period and were followed by a gradual conservation. The three women showed postoperative deficits that were slightly greater than those noted in the control period. On the other hand, the two men showed slightly greater sodium deficits during the three-day control period than they did postoperatively. We think that these slight variations are not significant, and that the deficits of sodium in the control and the postoperative periods can be regarded as comparable.

Although there were slight variations in the extent of the cumulative deficits of potassium and nitrogen and loss of body-weight for the control and postoperative periods, the alterations were related primarily to the diet and were not appreciably influenced by the operation. The average daily deficit of nitrogen was 6·4 g. postoperatively for the three women (fig. 1) and 7·6 g. for the two men (fig. 2) in group A. These deficits are similar to those exhibited by one healthy woman and two healthy men maintained for three days on a diet similar to that given to the patients in group A. The woman had an average daily nitrogen deficit of 5·3 g. and the men 8·0 and 8·2 g. (Holden et al. 1957).

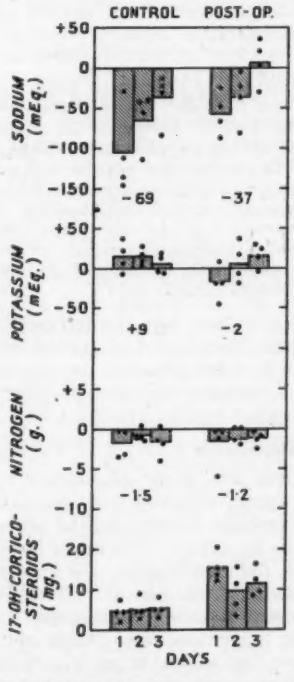
Fig. 3—Metabolic balances for sodium, potassium, and nitrogen and daily excretion of 17-hydroxycorticoids in 4 female patients receiving 5% dextrose in water containing about 90 mEq. of sodium and 80 mEq. of potassium during control and post-operative periods.

The length of the sodium, potassium, and nitrogen histograms represents the average daily balance for the 4 patients and the dots represent the individual daily values for each patient. The numbers below the balance charts represent the average daily balance for each period.

The remaining eight women (groups B and C) received daily about 90 mEq. of sodium and 80 mEq. of potassium.

The sodium balances of the four women in group B (fig. 3) varied only slightly above and below equilibrium, the oldest women (aged 61), who postoperatively showed a three-day cumulative positive balance of 175 mEq. of sodium with a three-day intake of 258 mEq. of sodium. With the exception of this patient, fluctuations of sodium balance during the postoperative period were not unlike those observed in healthy people on a constant diet.

There were only slight deviations from equilibrium in potassium balance in both the control and postoperative studies, if one excludes the data obtained from one patient who developed a wound infection during the postoperative period. She had pyrexia (100·4–102·2°F) for the first five postoperative days. This patient's cumulative postoperative three-day deficits of potassium and nitrogen were 160 mEq. and 33 g. respectively. These deficits are considerably greater than those noted for the other patients in this group and are attributed to the postoperative complication rather than the operative stress. If the data obtained from the study of this one patient are excluded, the average daily postoperative deficits of potassium and nitrogen of the remaining three patients in group B were 15 mEq. and 5·7 g. respectively, which are comparable to that of the female volunteer and the patients in group A.



The deficits of nitrogen during their control periods (fig. 3) are somewhat more difficult to explain. Two of the patients showed average daily nitrogen deficits during the control period of only 3·2 g. and 4·1 g. Such low nitrogen values are not often observed for at least several days after a healthy person is changed from a normal diet to a 500-600-calorie protein-free diet.

Thus, measured by sodium, potassium, and nitrogen balances, the postoperative metabolic response of the three patients in group B who had no complications was essentially the same as that of the patients in group

Fig. 4—Metabolic balances for sodium, potassium, and nitrogen and daily excretion of 17-hydroxycorticoids in 4 female patients given a solution of 5% protein hydrolysate containing 10% fructose and about 90 mEq. of sodium and 80 mEq. of potassium.

The length of the histogram represents the average daily balance for the 4 patients, and the dots represent the individual daily values for each patient. The numbers below the balance charts represent the average daily balance for each period.

A and the three healthy volunteers in the control period.

The metabolic alterations in the control and post-operative periods of the patients in group C, who received 5% protein hydrolysate in a 10% fructose solution with electrolytes, are shown in fig. 4. The deviations from equilibrium of potassium and nitrogen were less than those shown by the patients in the two other groups. Though their sodium balances varied somewhat, most of the patients showed smaller sodium deficits during the postoperative period than during the control period. The urine volumes were largest in this group who received the protein hydrolysate. The potassium intake was adequate to maintain these four patients, who received a modest amount of protein and calories, close to equilibrium. These four patients lost less body-weight than those who were not given nitrogen and had received only 500–600 calories from the intravenous dextrose (groups A and B). The fact that the patients in group C lost some weight and showed a nitrogen deficit during the control period probably indicates that the caloric intakes of these patients were suboptimal during both the control and the postoperative periods.

All the patients showed a fairly abrupt increase in the urinary excretion of 17-hydroxycorticoids on the day of operation or the first postoperative day. Over the next two to four days these values gradually returned to normal. The cumulative urinary 17-hydroxycorticoid values for the three-day postoperative periods were 50–250% above the values obtained during either the control or the repletion periods. The increase in the urinary excretion of 17-hydroxycorticoids showed no correlation with the postoperative sodium, potassium, or nitrogen balances.

Two patients, who received only dextrose in water, had almost identical postoperative three-day cumulative nitrogen deficits. However, the postoperative increase in the urinary 17-hydroxycorticoids in one of these patients was considerably greater than in the other. One of the other patients, who was given 5% protein hydrolysate in a 10% fructose solution during the control and the postoperative periods, was essentially in nitrogen equilibrium before and after operation. The post-operative increase of urinary 17-hydroxycorticoids of this patient was comparable to that shown by many of the other patients who had greater nitrogen deficits.

It is clear from these studies that the intravenous infusion of a suitable protein hydrolysate, when supported by adequate calories, will either minimise or prevent postoperative wasting of nitrogen and loss of weight, if complications are avoided.

Discussion

The data obtained from this study substantiate our previous findings, that operative trauma and anæsthesia per se are only minor factors in determining the pattern of the metabolic response to surgery. The major factors are the dietary regimens, the complications, the previous nutritional state, and the sex of the patient. We believe that the impression gained by other workers that the postoperative metabolic alterations are obligatory is derived largely from studies in which an insufficient amount of calories, little or no nitrogen, or a nutritionally inadequate protein hydrolysate was given.

In analysing data which we obtained from the study of other patients we have been impressed by the large losses of nitrogen, potassium, and body-weight when extensive blood-loss, necrotic tissue, or serious infection is present. When the intake of calories and protein is adequate, these nitrogen and potassium deficits can often be minimised but may continue until the blood-loss is at least partially corrected, necrotic tissue removed, or infection controlled.

After operation there is an increase in adrenal activity measured by the urinary output of 17-hydroxycorticoids. These hormones are desirable and are necessary in the resistance to injurious processes and help to maintain homœostasis. The endocrinological response to cholecystectomy in these patients was insufficient to cause changes in the sodium, potassium, and nitrogen balance from those noted during the control period. Aldosterone and adrenal steroids may often be liberated because of an inadequate intake of various nutrients or because injury has produced physiological changes or variations in body chemistry. The 17-hydroxycorticoids, like other hormones, may help to make available or conserve certain needed substances which influence cellular metbolism or permeability, and thus help to tide the injured organism over a period of stress. Increased amounts of antidiuretic hormones and aldosterone are made available when water and sodium are withheld from healthy people. Thus the liberation of such substances after injury or after an elective operation indicates that the body is conserving water or salt or both. Therefore judicious amounts of these substances should be given. We believe that the postoperative metabolic derangements should not necessarily be regarded as being caused by the increased endocrine activity but, rather, that the output of the various hormones may largely result from the physiological and biochemical changes caused by treatment and injury. Our findings lend additional support to the concept of " permissive activity " of the adrenal steroids as postulated by Ingle (1952, 1954) and supported by others (Conn et al. 1954, Engel 1952).

Conclusions

By providing adequate nutrients during the early post-operative period the restoration to a normal state can be aided rather than hindered. Adequate nutrition may also decrease the magnitude of the endocrine response after operation.

There was no correlation in this study between the nitrogen or electrolyte balance and the amount of 17-hydroxycorticoids excreted in the urine.

These studies indicate that, after an uncomplicated operation, the usual patient who does not have extrarenal losses should get daily 75–125 mEq. each of sodium and potassium. Such intakes should maintain a sodium and potassium balance near equilibrium or prevent appreciable deficits and excesses.

The loss of weight and wasting of nitrogen and potassium shown by the adult patient who is in an adequate state of nutrition after an uncomplicated elective operation are not obligatory but are primarily the result of the diet he has been given.

The occurrence and severity of postoperative complications are important factors influencing the magnitude of the metabolic response to operation. Though infection, hæmorrhage, tissue damage, &c., may greatly increase the caloric needs and accelerate the metabolic processes, these effects can be minimised by an adequate intake of calories and protein. It is essential, however, that any infection be controlled, necrotic tissue removed, and blood-loss corrected before these alterations due to complications can be eliminated.

References at foot of next column

SERUM-LIPIDS AND BLOOD-SUGAR LEVELS IN CHILDHOOD DIABETES

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THERE is wide agreement that the serum-lipoprotein level rises before the development of atheroma (*Circulation* 1956), but it has not yet been proved that the rise causes the disease (Ahrens et al. 1957). Less agreement exists about the precise lipoprotein fraction or fractions increased before atheroma.

In diabetes mellitus there is a well-recognised tendency for arterial disease to develop prematurely, leading to occlusive coronary disease, retinopathy, or nephropathy. It is uncertain to what extent these complications are preventable by strict diabetic control.

We have studied the serum-lipids and serum-lipoproteins in diabetic children. Though our patients showed no clinical evidence of arterial disease, they must be regarded as almost certain candidates for its development (White 1949), and therefore presented an opportunity for us to define the lipoprotein abnormality in the pre-atheromatous diabetic patient. We have also considered that abnormality in relation to such other factors as blood-sugar level, age, and duration of diabetes.

Patients and Methods

A study was first made of the levels of lipids and of lipoproteins in the serum of 35 children attending the diabetes clinic.

Our diabetic regime includes a diet wherein only the carbohydrate is regulated; but an ample supply of carbohydrate is allowed—e.g., 200–250 g. for a child aged 8/10 years. All the children receive a single injection of insulin-zinc suspension twenty to thirty minutes before breakfast. Blood for analysis was taken at a routine monthly visit to the clinic, neither parent nor child knowing beforehand that any special test would be applied. The clinic takes place in the afternoon; hence the blood was obtained two or three hours after the main meal, which contained 50–70 g. of carbohydrate. This explains why in many patients the blood-sugar level was high, even though the patients were all in good health and clinically free from diabetic complications, and routine examinations of urine in the patients' homes every morning and night usually indicated good or fair diabetic control.

Serum-lipoprotein was separated electrophoretically on absorbent paper into omega, beta, and alpha fractions; after staining with oil red O, the total lipid and the fractions were estimated by the method described by Salt and Wolff (1957). The usual normal values are included in table II.

Analyses of sera for total cholesterol (Sackett 1925), total esterified fatty acid (Stern and Shapiro 1953), and lipid phosphorus (method adapted from Gomori 1942) were also made.

Blood-sugar values were estimated by the Folin-Wu micro-technique, using unlaked blood in Herbert and Bourne's method (Harrison 1937).

In calculations a representative molecular weight of 277·2 was used for fatty acid; phospholipid (M.W. 806) was obtained by lipid phosphorus × 26.

We regard as conventional normal ranges for children: cholesterol 120–250, esterified fatty acid 190–450, and phospholipid 160–310 mg. per 100 ml. of serum.

Results

Scrutiny of the individual results from the 35 diabetes-clinic (treated) patients showed that only a few values for total lipid, beta-lipoprotein, esterified fatty acid, and cholesterol were above the normal range. Slightly raised levels of phospholipid were common; but here, as with other serum-lipid components, doubt exists about the precise extent of the normal ranges.

The analytical data were then collected into two subgroups according to the patients' blood-sugar level—A, below, and B, above, 200 mg. per 100 ml. A summary of the results is given in table I, together with the values for t and P (Fisher 1941), which furnish a statistical value of the magnitude and significance of the differences between the means.

The two subgroups are not distinctive in age-distribution, insulin dosage, or duration of diabetes. There is a trend in subgroup B toward a larger amount of total lipid in the serum. Of the three lipoprotein-lipid fractions the beta-fraction exclusively is significantly larger in subgroup B. The levels of cholesterol and of total esterified fatty acid in the serum are also significantly higher in subgroup B, but phospholipid shows no significant difference between the two groups.

To study more closely the correlation between the lipoprotein-lipid fractions and the blood-sugar level, the results were divided into five groups according to the patients' blood-sugar levels (up to 100 mg. per 100 ml., 100–200 mg. and so on), and for each group mean values for the lipoprotein fractions were calculated. The results of this analysis (fig. 1) show a progressive rise in the beta-lipoprotein lipid with each incremental step in the blood-sugar level in the higher ranges of blood-sugar. In contrast the alpha and omega fractions show no variation in relation to blood-sugar.

No relationship was apparent between any other factors, such as age of patient, degree of diabetic control assessed by long-term review, and the several serum-lipoprotein fractions.

Serial Observations in Individual Patients

Our first studies were based on the examination of a group of diabetic children all in good or fair control. In further studies we have attempted to determine whether the correlation between certain serum-lipids and blood-sugar levels exists also in the individual diabetic patient.

Besides the method already described, the level of total lipid in the serum was also estimated by the method of de la Huerga et al. (1953). Usually the results by the two methods were in fairly close agreement; on the few

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TABLE I—SUMMARY OF CLINICAL DATA AND LABORATORY FINDINGS FOR 35 CHILDREN WITH DIABETES MELLITUS

Clinical data and laboratory findings (mg. per 100 ml. except where otherwise stated)	Blood-sugar level								Statistical assessment of differences between means*	
	A, below 200 mg. per 100 ml. (13 patients)				B, above 200 mg. per 100 ml. (22 patients)					
	No. of observations	Range of values found	Mean value	S.D.	No. of observations	Range of values found	Mean value	S.D.	t	P
Patients' age (yrs.)	13	3–13	9·6	3·07	22	4–13	9·9	2·98	0·29	0·8
Daily insulin (units)	13	8–128	59	36	22	16–136	52	29	0·58	0·6
Duration of diabetes (yr.)	13	1·0–7·0	3·0	1·97	22	0·5–11·0	4·6	3·36	1·56	0·15
Serum-lipoprotein lipid:										
Total	13	368–907	635	140	22	490–1176	730	179	1·73	0·1
Omega fraction	13	19–228	101	65	22	25–204	97	45	0·21	0·9
Beta fraction	13	217–617	340	101	22	254–741	427	138	2·04	0·05
Alpha fraction	13	85–345	194	67	22	112–295	206	50	0·61	0·55
Beta/alpha ratio	13	1·1–4·5	1·97	0·98	22	1·1–4·4	2·18	0·81	0·68	0·5
Serum-total cholesterol:	11	93–240	159	41	18	114–306	213	46	3·18	0·01
Total esterified fatty acid	12	175–422	270	81	21	177–637	358	137	2·03	0·05
Phospholipid (as lecithin)	12	179–629	314	129	20	166–593	327	117	0·29	0·8

* Values of P = 0·05 or less indicate significant differences between the means.

occasions (mainly high levels) when there was substantial disagreement the estimations of total lipid by de la Huerga's method were preferred. These were regarded as the more correct on evidence from computations made by summation of the levels of esterified fatty acid, cholesterol, and glycerophosphoryl-choline (phospholipid residue) in the serum.

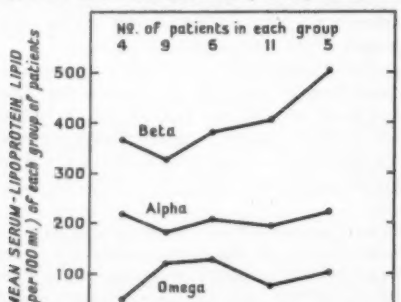

Fig. 1—Relationship between mean blood-sugar level and mean level of lipoprotein-lipid fractions in serum of diabetics under control. Each mean value is derived from a number of patients grouped by blood-sugar ranges up to 100, 100 to 200, &c., mg. per 100 ml.

Three previously untreated diabetic children were examined before and at various intervals after the start of insulin treatment. In addition, one diabetic girl, previously under treatment, was studied both in diabetic coma and during her recovery, which was delayed by the development of peripheral neuritis and gangrene.

In the following case-reports only the salient features are mentioned. The laboratory findings in the four cases are presented in table II.

Case-reports

Case 1.—A girl, aged 6 years, developed symptoms of diabetes mellitus in March, 1957. On admission to the Children's Hospital in May, 1957, her general condition was fair, and she was fully conscious and only slightly dehydrated. Her urine contained sugar (2 g. per 100 ml.) and ketones. The carbon-dioxide combining power of the serum was 43 volumes % (19 mEq. per litre). The levels of blood-sugar, serum-total lipid, and serum-beta-lipoprotein before and for forty hours after the institution of insulin treatment are shown in fig. 2.

A greatly increased amount of beta-lipid was mainly responsible for the initially enormous increase in the total lipid; within twenty-four hours of the start of treatment the beta fraction had fallen to within normal limits. It is particularly important to note that the precipitous fall of the blood-sugar level to 31 mg. per 100 ml. which followed the first injection of insulin (20 units) was accompanied by an equally rapid fall of the level of the beta-lipoprotein fraction.

Case 2.—A girl, aged 11 years, developed symptoms of diabetes mellitus in February, 1957, and was admitted to hospital in June, when she was found to be very thin, with a dry skin; she was fully conscious. Her urine contained glucose (2 g. per 100 ml.) but only a trace of ketones; acidosis was only moderate, with a carbon-dioxide combining power of 37 volumes % (16·5 mEq. per litre). Again the beta-lipoprotein level quickly returned to normal, though not quite so rapidly as in case 1.

Case 3.—A girl, aged 3 years, developed symptoms of diabetes mellitus in October, 1957; three weeks later, on admission to hospital, she was fully conscious and moderately dehydrated, and her urine contained glucose (2 g. per 100 ml.) and ketones. In this child, although ketosis was abolished during the first day of insulin treatment, the fall in blood-sugar level was only slight, and correspondingly the fall in serum-beta-lipoprotein level was slight.

Case 4.—A girl, aged 12 years, who had developed diabetes mellitus at the age of 3 years, was readmitted in December, 1956, in diabetic coma, with a serum carbon-dioxide combining power of 15 volumes % (7 mEq. per litre). After a stormy course her condition improved, but then she developed peripheral neuritis and gangrene of a toe. A second specimen of blood was examined four and a half months later, when those complications were still present. It is important to note that the lipoprotein

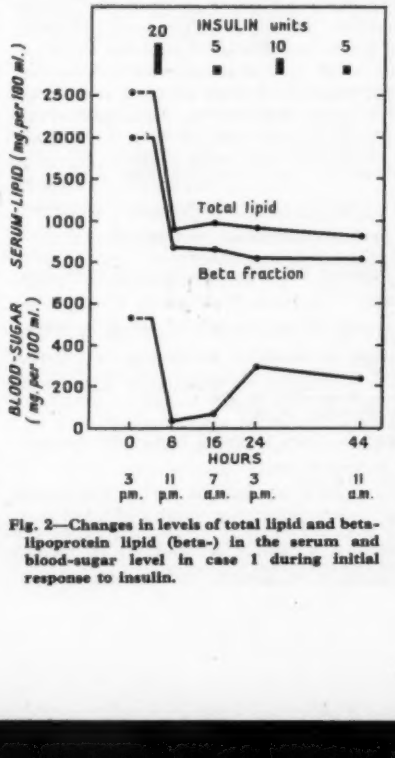

Fig. 2—Changes in levels of total lipid and beta-lipoprotein lipid (beta-) in the serum and blood-sugar level in case 1 during initial response to insulin.

TABLE II—SERIAL OBSERVATIONS ON THREE INITIALLY UNTREATED PATIENTS AND ON A PATIENT WHO DEVELOPED DIABETIC COMA

Case no.	Age (yr.)	Time of observation	Clinical state	Blood-sugar (mg. per 100 ml.)	Serum-lipid and lipoprotein-lipid fractions (mg. per 100 ml.)				Ratio beta/alpha	Position of beta-L.P. peak and character of beta-L.P. band*
					Total	Omega	Beta	Alpha		
1	6	0 hours	Untreated	534	2560	333	1997	230	8·7	Advanced*
		8 ,,	4 hr. after 1st insulin	31	900	63	684	153	4·5	Advanced*
		16 ,,		71	990	109	673	208	3·2	Advanced*
		24 ,,		300	920	221	561	138	4·1	Advanced*
		44 ,,		242	820	82	549	189	2·9	Normal*
2	11	0 hours	Untreated	935	1010	111	727	172	4·2	Advanced
		4 ,,	3 hr. after 1st insulin	273	1020	112	704	204	3·5	Advanced
		16 ,,		232	1040	156	676	208	3·3	Advanced
		5 days		46	860	69	464	327	1·4	Normal*
3	3	0 hours	Untreated	477	1170	80	950	140	6·8	Advanced
		21 ,,	18 hr. after starting insulin	370	1070	118	728	224	3·3	Advanced
4	12	0 days	In diabetic coma	1570	1005	151	653	201	3·2	Advanced
		129 ,,	Peripheral neuritis and gangrene	200	637	32	369	236	1·6	Normal
Normal range (Salt and Wolff 1957)					466–860	0–105	302–576	152–283	1·6–3·0	Normal

* Denotes leading edge of beta-lipoprotein band advanced toward the anode.

abnormality was present before the vascular complications, and that later, when the blood-sugar level was 200 mg. per 100 ml., the lipoprotein pattern was normal despite the persistence of the vascular complications.

Table II shows that in these patients the beta-lipoprotein levels closely followed the blood-sugar levels, but that no corresponding changes took place in the levels of the omega and alpha fractions of lipoproteins. In all uncontrolled patients the beta-lipoprotein peak occupied an advanced electrophoretic position, and in some instances that peak appeared to be heterogeneous with a subfraction (designated *) lying ahead of the main peak. Moreover case 4, when in diabetic coma, showed a fraction of alpha-lipoprotein in a position ahead of albumin—a feature already reported by Salt and Wolff (1957).

Discussion

Classical investigations into the disorder of lipid metabolism in diabetes mellitus (summarised by Peters and Van Slyke 1946) led to the view that, in severe cases with a tendency to ketosis and acidosis, there was a general increase of all the blood-lipids. The degree of lipæmia was thought to depend not on the severity of the diabetes but rather on the success of insulin therapy in controlling the disorder of carbohydrate metabolism. In diabetic patients who utilise sufficient carbohydrate the serum-lipid levels and patterns were regarded as substantially normal.

Our findings in children, which now include observations of the serum-lipoprotein fractions, are in the main in agreement with the classical view. The three initially untreated patients, in none of whom ketosis was severe, and the one who developed diabetic coma all presented with high levels of total lipids and beta fractions in the serum. Under insulin treatment, as the blood-sugar level fell, those high serum-lipid levels reverted either to normal or, in case 3 observed for a short time only, toward normal.

Among the diabetes-clinic patients the mean values in both subgroups all lay within normal limits, except the mean phospholipid levels. Attention thus became focused on certain statistically significant differences between the means in the two subgroups. In subgroup B the levels of cholesterol, esterified fatty acid, and beta-lipoprotein lipid in the serum were significantly higher than those in subgroup A. It seemed reasonable to infer that the increased lipid of the beta-lipoprotein complex was mainly cholesteryl ester, with some phospholipid, perhaps, in certain cases. However, we emphasise that the principal finding in this study is the higher level of beta-lipoprotein in the serum of diabetic children with higher blood-sugar levels, irrespective of the exact nature of the lipid constituents of the beta-lipoprotein complex.

Bowen (1951) examined by Tiselius electrophoresis the beta-globulin-bound lipid in the sera of healthy people and diabetic patients; he correlated the total cholesterol in the serum with extractable beta-lipid and found no significant difference between the correlation established for the healthy people and that for the well-controlled diabetic patients.

Baker et al. (1955), who studied the serum-lipoproteins by paper electrophoresis in diabetes-clinic patients, mainly adults, and in controls, found the beta/alpha ratio significantly higher in the diabetic patients, especially when the diabetes was accompanied by clinical evidence of atheroma. Such high beta/alpha ratios have been described in non-diabetic atherosclerotic patients by Rosenberg et al. (1954).

Keiding et al. (1952), Barach and Lowy (1952), and Tuller et al. (1954) investigated the levels of cholesterol and of ultracentrifugally separated lipoproteins in the serum of diabetic patients with vascular complications. Although the relationships are not fully understood, there appear to be definite links between disorders of serum-lipids and the development of arterial disease in diabetes. In the present case 4 the lipid abnormality preceded the vascular complications, but was reversible despite persistence of those complications.

Harris et al. (1953) showed that the hyperlipæmia of diabetic acidosis involves all fractions of the serum-lipids, especially the triglyceride fat.

Waagstein (1955) correlated the amounts of total lipids in the serum with blood-sugar levels in diabetic patients.

Hirsch et al. (1953) correlated the increased amounts of esterified fatty acids in the serum with high blood-sugar levels in diabetics.

Our results suggest that, during the course of diabetic illness, there may be repeated intermittent rises of level of beta-lipoprotein lipid in the serum whenever the blood-sugar level is raised through inadequacy of insulin action. The main ground for this speculation lies in the finding of statistically higher levels of beta-lipoprotein lipid in the serum of patients who, though free from ketosis and acidosis, had higher blood-sugar levels at the time of examination.

Further support is seen in the speed with which the levels of the beta-lipoprotein fraction returned to normal in the previously untreated patients as the blood-sugar levels fell under treatment with insulin, even when initial ketosis had not been severe. How rapidly the level of

beta-lipoprotein in the serum follows the blood-sugar level in the controlled diabetic cannot be deduced from the studies reported here.

In considering the several factors which may determine the rise of the serum-beta-lipoprotein level, hæmoconcentration (Harris et al. 1953) may be set aside as regards our group of clinic patients. Similarly, normal alimentary absorption, which is known to lead to an intermittent increase in the omega (chylomicron) fraction in the serum, without significantly affecting the beta and alpha fractions, can be disregarded, provided that utilisation is unimpaired.

The important mechanisms of mobilisation of lipid from the adipose-tissue stores must next be considered. It is known that, when carbohydrate is unavailable, lipid is mobilised to meet energy requirements; in diabetes a raised blood-sugar presumably indicates unavailability of glucose. The mobilised lipid may be non-esterified fatty acid bound to albumin (Dole 1956, Gordon and Cherkes 1956, R. S. Gordon 1957) or very-low-density lipoproteins including chylomicrons (Havel 1957).

Although in part the mobilised material may consist initially of triglyceride fat, Salt and Wolff (1957) have observed that, in malnutritional states, the beta-lipoprotein level in the serum was raised and, in addition, the beta-lipoprotein took up an advanced electrophoretic position—a feature again noted in all our diabetic patients who were either untreated or out of control.

It seems that lipolysis of mobilised lipid liberates fatty acid, and this may attach itself to beta-lipoprotein (besides albumin) and in extreme cases even to alpha-lipoprotein, thus causing increased electrophoretic mobilities of those lipoprotein fractions.

Lastly, in considering raised levels of the serum lipoproteins, it is uncertain whether, or to what extent, there may be impairment of utilisation. If this is a factor, both the quantity and the lability of absorbed alimentary lipid deserve consideration.

The outstanding problem of childhood diabetes is the prevention of arterial complications. Possibly this could be achieved through control of the blood-lipid levels, especially that of the beta-lipoprotein fraction. To this end our findings confirm the desirability of maintaining a strict control of blood-sugar levels because this in turn would limit the degree of intermittent or persistent hyperlipæmia. However, the difficulties of maintaining strict control, particularly in children, are considerable, and some additional and more direct attack on the hyperlipæmia therefore seems desirable.

The feeding of fats containing a high proportion of unsaturated fatty acids has been widely advocated recently as a means of lowering blood-lipid levels in the hope of preventing atherosclerosis. Already Kinsell et al. (1954) and E. S. Gordon (1957) have fed such diets to diabetic patients and were successful in lowering the levels of certain lipid constituents in the blood. A similar prolonged dietary trial in diabetic children before the onset of arterial disease should yield important evidence about whether or not a blood-lipid abnormality is a cause of the arterial complications in diabetes. By inference it might even throw further light on the ætiology of atheroma in non-diabetic persons. So far we have fed to one diabetic patient an emulsion of unsaturated triglyceride with resultant lowering of her serum-lipid level. Further experiments along these lines are planned.

Summary

Specimens of blood from 35 children, all under good or fair diabetic control, were analysed for the levels of sugar in the blood and for the levels of total lipid, lipoprotein-lipid in three electrophoretic fractions, cholesterol, esterified fatty acid, and phospholipid in the serum.

The mean levels of beta-lipoprotein lipid, cholesterol, and esterified fatty acid in the serum were significantly higher in the children with blood-sugar levels above 200 mg. per 100 ml. than in those with levels below 200 mg. per 100 ml. A progressive rise of beta-lipoprotein level in the serum was observed with a rising blood-sugar level.

In three hitherto untreated patients with only moderate or slight ketosis the initial levels of serum-lipid were high, the rise being largely due to the beta-lipoprotein fraction. Under treatment with insulin, as the blood-sugar level fell the level of beta-lipoprotein in the serum also fell; in 2 cases it reverted to normal within one or a few days.

One girl, a long-known diabetic, was found to have a very high level of total lipid and beta-fraction in her serum when admitted in coma. Her recovery was complicated by gangrene and peripheral neuritis. Four months after the coma, when the complications were still present, her serum-lipoprotein pattern was within the normal limits when the blood-sugar level was near normal. In this case the serum-lipid abnormality preceded the development of arterial disease but remained reversible despite the persistence of complications.

The results support a hypothesis that hyper-beta-lipoproteinæmia develops whenever insufficient carbohydrate is available for metabolic needs. The high levels of beta-lipoprotein and cholesterol in the serum resemble those known to precede the development of atheroma in non-diabetic persons. Although the increased amount of beta-lipoprotein has not been proved to cause the early development of arterial complications in juvenile diabetics, the facts strongly suggest the desirability of maintaining normal serum-lipid patterns.

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INFLUENCE OF POSITION AND ACTIVITY ON THE SECRETION OF ALDOSTERONE *

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WHEREAS the diurnal rhythm in the urinary excretion of corticosteroids is well established, comparatively little is known about the day-and-night cycle of aldosterone. Most workers have detected a diurnal pattern in ambulant normal persons. On the other hand, Garrod, Simpson, and Tait (1957) did not find one in normal subjects who were recumbent; and this strongly suggested that the day-and-night difference in excretion of aldosterone depends solely on the position and activity of the person concerned. To ascertain whether this is so, we made a series of observations on subjects who kept changing their position and activity.

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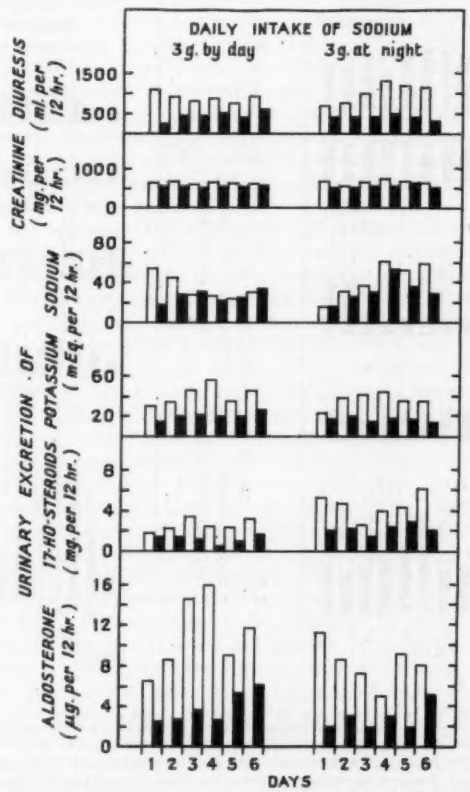

Fig. 1—Influence of sodium intake on daily pattern of urinary excretion of aldosterone in a healthy woman leading a normal life. Whether salt is taken by day or at night, urinary excretion of aldosterone, 17-hydroxycorticosteroids, and potassium is greater by day than at night. Urinary excretion of sodium has no definite day-and-night rhythm and no correlation with excretion of aldosterone.

Methods

The subjects studied were healthy persons and a hypophyseal dwarf aged 19. All were maintained on a constant diet containing relatively little sodium. On two occasions the patient with pituitary insufficiency was given prednisone by mouth every six hours.

Urine was collected every twelve hours starting from 7 A.M. and analysed for sodium and potassium in a flame photometer. Creatinine was determined by the method of Folin (Peters 1942) and chloride by that of Sanz and Brechbühler (1955). The urinary 17-hydroxycorticosteroids were determined by a modification of Reddy's method (Hertoghe et al. 1955) in the normal subjects and by the method of Norymberski and Stubbs (1954) in the hypophyseal dwarf. Aldosterone was analysed chromatographically after acidification of the urine at pH 1 for twenty-four hours (method *d* of Neher and Wettstein 1955).

Results

Fig. 1 shows the findings in a woman of 32. She ate three meals a day (at the same hours every day) containing less than 12 mEq. of sodium. In the first experiment NaCl 1 g. (17 mEq.) was added to each meal, whereas in the second experiment she ate the 51 mEq. of salt during the night. She maintained her normal activity, working regular hours, and always went to bed between 10 and 11 o'clock at night. Despite this variation in the salt intake, there was in both experiments a clearcut regular day-and-night difference in the urinary aldosterone excretion. The urinary output of sodium, however, was not greater by day than at night. No correlation between the urinary excretion of aldosterone and that of sodium was found. Potassium, 17-hydroxycorticosteroids, and water were always excreted in greater quantities by day than at night.

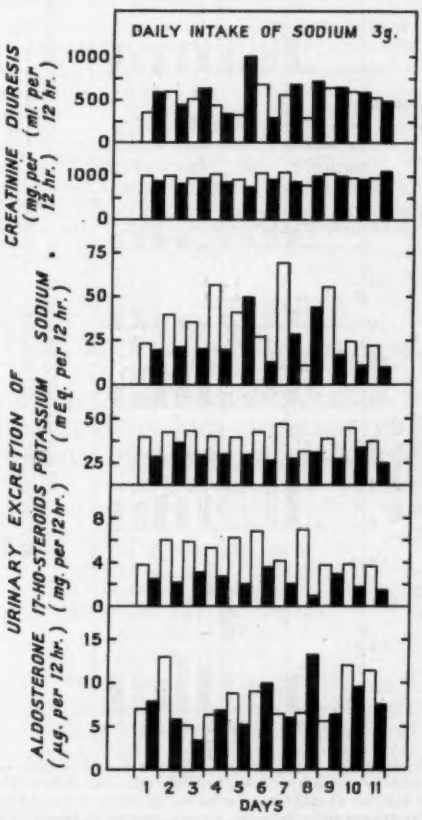

Fig. 2—Diurnal and nocturnal urinary excretion of aldosterone in a healthy man with very irregular working hours, night and day. Note absence of regular day-and-night pattern of excretion of aldosterone. Contrast fig. 1.

Fig. 2 illustrates a similar study. A man, aged 35, took a constant diet containing 3 g. (50 mEq.) of sodium daily; but he ate his meals at different hours of the day and night. He was working irregular hours during the whole experiment, and his sleep was often interrupted. On several occasions he was up and working a good part of the night. In these circumstances there was no day-and-night difference in the excretion of aldosterone. The output of urine and the excretion of creatinine were also less regular than in the previous study. However, this time more sodium was excreted by day than at night. The daily pattern of excretion of potassium and 17-hydroxycorticosteroids was identical with that found in the previous study.

Fig. 3 shows the results of a metabolic study of a healthy woman, aged 33, who intentionally changed position and activity during the day, whereas at night she was always horizontal in bed and inactive. On the first, fifth, sixth, seventh, and ninth days she was up and ambulant, carrying on her usual activities. On the second, third, fourth, and eighth days she lay flat and inactive in bed day and night. The increased excretion of aldosterone during the day was clearly seen whenever she was up and working during the daytime. As soon as she lay flat for twenty-four hours, the rhythm was interrupted and sometimes even reversed, with a larger excretion at night. The overall excretion of aldosterone was greater when she was ambulant than when she was lying flat and inactive in bed. Similar changes related to position and activity were found in the excretion of sodium. While the woman was ambulant she actively retained sodium (89 and 8 mEq.) and there was no difference in excretion between day and night. As soon as she lay flat throughout the twenty-four hours, not only was sodium excreted (49 and 40 mEq.) but also a daily pattern became manifest, with increased excretion during the day. During this same period, for the first time, the ratio of aldosterone to sodium in the urine was inverted. The excretion of chloride and the output of water had practically the same pattern as that of sodium, whereas potassium was excreted mainly by day. In contrast to the aldosterone excretion pattern, the urinary 17-hydroxycorticosteroids were, throughout the study consistently higher during the day than at night, despite changes in position and activity.

Fig. 4 shows the findings in the male hypophyseal dwarf. He was ambulant from 7 A.M. to 10 P.M. The rest of the time he slept flat in bed. His urine was collected separately for those periods; and, since the periods were unequal, the results had to be expressed per hour. During the last five days of the experiment the patient was given prednisone. Despite his upright position and his activity there was no difference in urinary excretion of aldosterone between the day and the night when glucocorticoids (in his case prednisone) were withheld; but the increase in excretion of sodium by day was striking and apparently independent of the aldosterone excretion. The night diuresis was also conspicuous and disappeared under treatment with prednisone. The excretion of

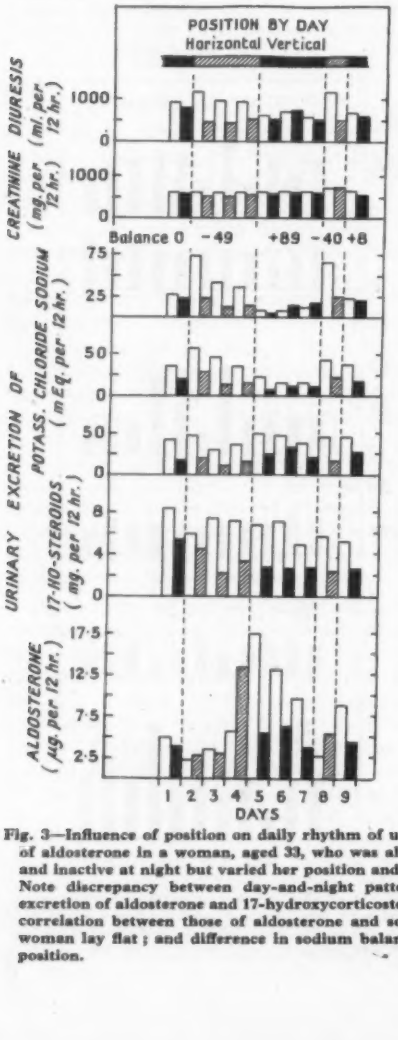

Fig. 3

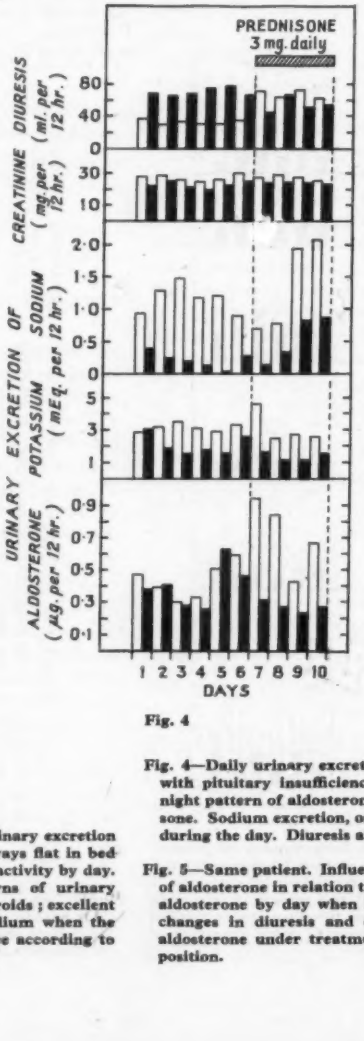

Fig. 4

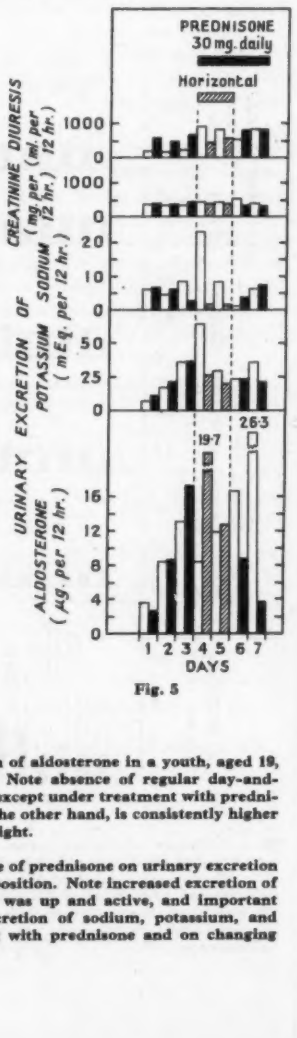

Fig. 5

Fig. 3—Influence of position on daily rhythm of urinary excretion of aldosterone in a woman, aged 33, who was always flat in bed and inactive at night but varied her position and activity by day. Note discrepancy between day-and-night patterns of urinary excretion of aldosterone and 17-hydroxycorticosteroids; excellent correlation between those of aldosterone and sodium when the woman lay flat; and difference in sodium balance according to position.

Fig. 4—Daily urinary excretion of aldosterone in a youth, aged 19, with pituitary insufficiency. Note absence of regular day-and-night pattern of aldosterone except under treatment with prednisone. Sodium excretion, on the other hand, is consistently higher during the day. Diuresis at night.

Fig. 5—Same patient. Influence of prednisone on urinary excretion of aldosterone in relation to position. Note increased excretion of aldosterone by day when he was up and active, and important changes in diuresis and excretion of sodium, potassium, and aldosterone under treatment with prednisone and on changing position.

potassium by day was again increased and hardly influenced by the administration of prednisone. Despite the pituitary insufficiency, the excretion of 17-hydroxycorticosteroids still kept its daily pattern, with slightly increased excretion during the day. (Not shown on the figure.)

In a second experiment the same hypophyseal dwarf was again given prednisone, but this time while lying flat in bed for forty-eight hours (fig. 5). The two experiments show that, when this patient was having prednisone, his urinary excretion of aldosterone increased in the daytime if he was ambulant and active but not if he was recumbent. That is to say, the glucocorticoids (prednisone) per se did not alter the secretion of aldosterone: their action seemed to be permissive. Once again the excretion of sodium was not related to that of aldosterone, except to some extent when the patient was recumbent. The output of urine was affected by the prednisone, and the excretion of potassium was very irregular.

Discussion

These data, as well as those published elsewhere (Muller et al. 1957), demonstrate unequivocally that position and activity influence the urinary excretion of aldosterone, whereas taking small amounts of salt at night instead of by day has no such influence. On the basis of our earlier findings and those of other workers the increased urinary excretion of aldosterone can be taken, in the circumstances of the experiments, as reflecting increased secretion of aldosterone by the adrenal glands.

Bartter (1957) has shown that a decrease in blood-volume stimulates the secretion of aldosterone. Since (as has long been known) standing contracts the "effective blood-volume", it is very likely that the increase in urinary excretion of aldosterone really reflects a homœostatic mechanism set off by a decreased effective blood-volume due to the effect of position and exercise on the circulating blood-volume. As Peters (1948) suggested, this mechanism may operate also in hæmorrhage and in congestive heart-failure.

The retention and elimination of sodium shown at different periods in fig. 3 certainly coincide, respectively, with increased and with decreased secretion of aldosterone. It therefore seems that the increased retention of sodium on standing and exercise is caused by (among other factors) an increased secretion of aldosterone, which in turn is caused by contraction of the effective blood-volume. In a similar way rest in bed increases the excretion of sodium by reducing the secretion of aldosterone.

On the other hand, our results show, in the ambulant person, no correlation between the day-and-night cycles of sodium and of aldosterone. They are therefore consistent with the view that alterations in the effective blood-volume on standing and exercise not only influence the secretion of aldosterone but also initiate acute renal adjustments in sodium excretion (Epstein et al. 1951). These renal mechanisms seem to be independent of aldosterone, which explains their presence in Addison's disease. The fact that the patient with pituitary insufficiency showed a constant difference between his diurnal and his nocturnal excretion of sodium, whether or not there was any such a difference in his excretion of aldosterone (fig. 4), is another example of this dissociation between the sodium and aldosterone cycles. In the recumbent subjects, however, the ratio between sodium and aldosterone in the urine tended to be inverted.

The absence of a day-and-night difference in the excretion of aldosterone by the ambulant active patient with pituitary insufficiency is difficult to explain; so is the effect of prednisone in re-establishing this difference. The fact that under treatment with prednisone this rhythm appears only if the patient is ambulant is another example illustrating the permissive rôle of the glucocorticoids. Standing erect, by increasing the capillary filtration and the pooling of blood in the limbs, decreases both the effective and the total blood-volumes. Possibly cortisone and prednisone influence this pooling of blood by increasing capillary permeability, whereby the effective blood-volume decreases, and the secretion of aldosterone is consequently stimulated.

Summary

The difference between diurnal and nocturnal excretion of aldosterone in the urine was studied in three healthy people and one patient with pituitary insufficiency.

The findings unequivocally demonstrate the influence of position and activity on the daily pattern of aldosterone excretion. A small change in the diurnal and nocturnal intake of sodium chloride has no influence on this pattern. The greater excretion of aldosterone by day seems to be the result of the erect position and activity. A contraction of the effective blood-volume, as a result of standing and exercise, is postulated as the physiological stimulus of the aldosterone secretion. However, the changes in sodium excretion due to position and exercise are mediated not only by the secretion of aldosterone but also by adjustments in renal mechanisms.

In the patient with pituitary insufficiency the excretion of aldosterone was not greater by day than at night, despite ambulation and activity. Treatment with prednisone re-established the greater excretion of aldosterone by day than at night, provided the patient was up and active, but not when he was lying flat.

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TREATMENT OF SEVERE TETANUS BY CURARISATION AND INTERMITTENT POSITIVE-PRESSURE RESPIRATION

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DESPITE all treatment, the case-mortality of generalised tetanus is still high. The physician has often been faced with the dilemma of a patient who may die either of cerebral anoxia due to tetanic spasms, or of respiratory paralysis (with aspiration of secretions) caused by increasing the dosage of sedative and relaxant drugs.

Drawing on their extensive experience of bulbar poliomyelitis, Lassen, Ibsen, and their coworkers (1953, 1954,

1956) realised that the problem of respiratory paralysis can be solved by introducing, through a tracheostomy, a cuffed tube, through which artificial respiration may be applied. They treated their tetanus patients by long-continued anæsthesia (N_2O and O_2), sometimes combined with administration of tubocurarine chloride. A case treated successfully on these lines was reported by Shackleton (1954), who administered N_2O and O_2 with suxamethonium. The use of full curarisation and intermittent positive-pressure respiration (I.P.P.R.) in tetanus has been reported by Honey et al. (1954), Mollaret et al. (1955), and Crampton Smith et al. (1956).

We have treated two patients successfully by methods evolved by the Oxford workers, and we acknowledge with gratitude the assistance which we have received from Dr. Ritchie Russell, Dr. J. M. K. Spalding, and, in particular, Dr. Crampton Smith, whom we consulted frequently.

Case-reports

THE FIRST CASE

A girl, aged 6, fell and sustained a tiny puncture wound on her knee on April 20, 1957. Seven days later tetanus came on rapidly, and four hours later she was admitted to hospital with severe spasms.

Initial treatment. After a preliminary test dose, antitetanic serum 100,000 units was given in the first twenty-four hours. Further doses of 50,000 units each were given on the fourth, eighth, and twelfth days preceded by promethazine hydrochloride by mouth 25 mg.: there was no adverse reaction. Penicillin was given for the first ten days, then withheld, and then given again from the twelfth day for twenty-one days following serious deterioration in the patient's general condition.

Because paraldehyde and barbiturates did not control her spasms, mephenesin was added on the second day, 250 mg. being given every half-hour by stomach-tube. In spite of this the spasms became more frequent and more severe. Her temperature rose steadily despite tepid sponging, ice packs, and the use of a fan, and reached 107°F forty-eight hours after the start of treatment.

Artificial respiration. In view of this deterioration, and in particular because of our inability to control her temperature, it was decided to give tubocurarine and maintain artificial respiration with a Radcliffe intermittent positive-pressure respirator.

The child was anæsthetised by one of us (K. J. P.) with nitrous oxide and oxygen, complete relaxation being obtained with tubocurarine. After a cuffed endotracheal tube had been introduced, manual respiration was applied with a bag. Tracheotomy was then performed by Mr. Philip Scott, after which a short cuffed endotracheal tube was introduced and connected to a Radcliffe respirator. Administration of nitrous oxide was discontinued, but oxygen 1 litre per minute was given with the inspired air. The respirator was adjusted to give a minute volume of 4–5 litres.

The following routine was then adopted:

(1) Tubocurarine 10–15 mg. was given intramuscularly with hyaluronidase, except when intravenous fluids were being given, when the tubocurarine was added with them. The need of a further dose of tubocurarine was indicated by the appearance of muscular twitchings, which were regarded as modified tetanic spasms, and by any decrease in the respiratory minute volume which could not be accounted for by obstruction of the airway. The daily requirement of tubocurarine varied between 95 and 250 mg. (average 160 mg.).

(2) Percussion and postural drainage were applied four-hourly during the day by the physiotherapist, who often gave additional treatment during the night.

(3) The trachea and bronchi were cleared of secretions by suction through a soft rubber catheter each time the patient was turned, or more frequently if required. Bronchoscopy was required on only two occasions. Pharyngeal secretions were sucked out, and the cuff of the endotracheal tube deflated for two or three minutes every two hours.

(4) The respiratory minute volume was measured half-hourly and any decrease remedied by suction, with further tubocurarine, or by adjustment of the respirator.

(5) Temperature and pulse were recorded half-hourly, and a rise was found to be a useful indication of segmental or lobar pulmonary collapse.

(6) The stomach-tube was aspirated hourly, and feeds of a fortified milk mixture* were given to supply the patient's estimated requirements of 1600 calories and 1500 ml. of fluid daily. Vitamins were also given routinely through the tube. A transient increase in the gastric aspirations twenty-four hours after curarisation made it necessary to give intravenous feeding for twelve hours, after which normal gastric function returned and tube feeding was therefore resumed.

Progress

On the fourth day Mr. C. C. Jeffery excised the wound on the knee, removing a small piece of woody stem from a goldenrod plant, surrounded by a pocket of pus, from which *Clostridium tetani* was later isolated. The wound was cleaned with hydrogen peroxide and sutured.

On the eleventh day a severe episode of lobar collapse with cyanosis was followed by a rapid rise in temperature and pulse-rate, even after re-expansion of the lung had been obtained by bronchoscopy. Four hours later, severe peripheral circulatory failure developed with unrecordable blood-pressure. An intravenous infusion of noradrenaline was started immediately. The amount of noradrenaline required to raise the blood-pressure to normal levels was so great that 16 mg. had to be added to each 500 ml. of 5% dextrose. By this means the systolic blood-pressure was restored to 110 mm. Hg after five hours. After remaining critically ill for twenty-four hours the patient gradually needed less noradrenaline until, after forty hours, it was withdrawn completely.

Chloramphenicol treatment of a superficial infection of the tracheostomy was begun on the day on which she developed peripheral circulatory failure, and eighteen hours later penicillin therapy was restarted and antitetanic serum 50,000 units was given. The patient's temperature and pulse-rate then fell rapidly, reaching their previous levels after twenty-four hours.

Her requirements of tubocurarine remained fairly constant for fifteen days, until, on the evening of May 15, the signs indicating the need for a further injection did not appear, and no tubocurarine was given. Twelve hours after her last dose of tubocurarine the patient was taken off the respirator, having had I.P.P.R. for sixteen days. Radiography showed that her chest was clear and her spine had no collapsed vertebra.

THE SECOND CASE

A girl, aged 10, fell off a seesaw on June 23, 1957, sustaining a compound fracture of her right radius and ulna. She was admitted to a local hospital, where the wound was cleaned and excised and the fracture reduced and put into plaster. She was not given antitetanic serum. Five days after her injury she developed tetanus, and was transferred to the Royal Devon and Exeter Hospital, accompanied in the ambulance by a consultant anæsthetist equipped with apparatus for intubation if required.

Initial Treatment

After a preliminary test dose, antitetanic serum 200,000 units was given on the first day, and further injections of 100,000 units each were given on the second, third, fourth, and sixth days.

The compound-fracture wound was opened up widely by Mr. Jeffery, and *Cl. tetani* was subsequently cultured from it. Penicillin was given throughout the first three weeks in hospital.

* Fortified Milk Mixture: 2 pints milk (1136 ml.); 2 oz. glucose (56 g.); 2 oz. 'Casilan' (56 g.); 2 eggs; 1 teaspoon 'Marmite'; ½ teaspoon salt. Calorie value 1364.

Mephenesin 200 mg. half-hourly and quinalbarbitone gr. 1½ six-hourly were given by stomach-tube and paraldehyde 4 drachms by the same route as required to control the spasms (usually every three or four hours). Although for three days the spasms were fairly well controlled, the amount of paraldehyde required rendered the child deeply unconscious. Although physiotherapy and postural drainage were applied four-hourly, on the fourth day of her illness her cough reflex became so diminished that she had a severe episode of bronchial obstruction with profound cyanosis. A large amount of inspissated mucus was found in her mouth and pharynx. Bronchoscopy was done immediately (K. J. P.), and a plug of mucus was removed from the right main bronchus.

Artificial Respiration

In view of these dangerous respiratory complications, treatment with tubocurarine and I.P.P.R. was instituted without delay. Mr. Raymond Hinde kindly carried out the tracheotomy.

The general management was then similar to that in case 1. The amount of tubocurarine needed was 380–500 mg. (average 440 mg.) daily, and feeds of the fortified milk mixture were given to provide 2000 calories and 2 litres of fluid daily. The respiratory minute volume was maintained at 6 litres per minute. Seven hours after treatment with tubocurarine had been started, tube feeding had to be discontinued because large quantities of fluids were being aspirated from the stomach. After thirty hours, during which time fluids were given intravenously, tube feeding was successfully resumed. Transient collapse of her right upper lobe occurred on the third day of I.P.P.R., but in general the chest remained remarkably clear.

The child's need of tubocurarine remained fairly constant until the thirteenth day, when the drug was withheld without the development of tetanic spasms. On July 15, after fourteen days' I.P.P.R., she was finally taken off the respirator. Radiography showed some vertebral compression of the 4th, 5th, and 6th dorsal vertebræ. In all other respects her recovery was complete.

Discussion

Curarisation and I.P.P.R.

For these two patients treatment with tubocurarine and I.P.P.R. was started only after large doses of hypnotic drugs and mephenesin had failed to control the spasms. Indeed it must be admitted that our second patient was allowed to reach a point at which the laryngeal reflexes were dangerously depressed by sedation. In the light of our experience with these two patients it now seems to us that all cases of tetanus in which the spasms cannot be controlled by moderate sedation and mephenesin should be treated by complete paralysis and I.P.P.R.

A further indication for the administration of tubocurarine in our first patient was our inability to control her extreme pyrexia. Vigorous surface-cooling produced only chilling of the skin and violent shivering. It was not until this shivering had been overcome by complete paralysis that the temperature could be lowered. It did not seem advisable or necessary to enhance this treatment with a lytic cocktail as advocated by Rossi et al. (1954).

After initial intravenous injection of tubocurarine, satisfactory results were obtained with intramuscular injection of the drug, usually with hyaluronidase. Relaxation was evident in five minutes.

Sedatives and hypnotic drugs were used sparingly in the later stages of treatment in case 1 and scarcely at all in case 2. Ten days after the cessation of treatment neither of these children, both of whom are of at least average intelligence, could recall any detail of their period of artificial respiration. In particular they have no recollection of any pain. Possibly the respirator may have induced a slight degree of hyperventilation, which may partly explain some of the clouding of consciousness and subsequent amnesia.

Artificial respiration was given along the lines described by Crampton Smith et al. (1956), a standard Radcliffe respirator being used. For the most part the patients breathed ordinary air to which oxygen 0·5–1·0 litre per minute was added. There was no indication for the use of nitrous-oxide anæsthesia once the tracheostomy was completed; indeed the dangers of aplastic anæmia following long-continued administration of this gas (Lassen et al. 1956) strongly contraindicated such a procedure.

Movements of the eyes and tongue were often noticed when the patient was otherwise completely paralysed and gave no indication of the need of more tubocurarine.

Physiotherapy and Tracheobronchial Toilette

Pulmonary complications were fewer than was expected.

This appeared to be due largely to the postural drainage applied by an expert physiotherapist five times each twenty-four hours, and more often if required, and to the routine toilette of the tracheobronchial tree by at least half-hourly aspiration through a soft rubber catheter. Undoubtedly the humidification of the inspired air (Marshall and Spalding 1953) and the fact that the foot of the bed was kept constantly raised were also important factors in this respect.

The inevitable transient episodes of pulmonary collapse could be quickly detected by a rising pulse-rate, slight cyanosis, and a simultaneous decline in the respiratory minute volume unexplained by the need of more tubocurarine. Re-expansion could readily be obtained by vigorous physiotherapy and aspiration. Frequent chest radiography was of little value in view of the rapidity with which the chest condition altered.

Specific Therapy

Antitetanic serum.—Both patients were given large and often repeated intramuscular injections of antitetanic serum, each preceded by an oral anti-histamine drug. No ill effects were detected; indeed the temperature and pulse-rate fell on several occasions a few hours after the injection.

Reference must be made also to the dramatic deterioration in case 1 on the eleventh day of the illness.

We have no doubt that she would have died at this time in peripheral circulatory failure if she had not responded to the noradrenaline infusion. It is of interest that the penicillin given from the start of the illness had been stopped two days before this collapse, and no antitetanic serum had been given in the previous four days. The child remained extremely ill with high fever (104·2°F) for eighteen hours until a further intramuscular injection of antitetanic serum 50,000 units was given. Within four hours of this she rapidly improved, and shortly afterwards it became possible gradually to withdraw the noradrenaline infusion. Though the possibility that this episode of profound toxæmia was due to *Staphylococcus pyogenes* septicæmia obtaining entry through the tracheostomy wound cannot be excluded, a true tetanus toxæmia, not relieved until more antitetanic serum was given, seems to us to be much more probable.

Thus we cannot accept the view of various American authorities (Abel et al. 1938, Dietrich 1940), who advise only a single injection of antitetanic serum, or of Spaeth (1940), who deprecates its use altogether. Provided that a test dose produces no reaction and that each injection is preceded by an anti-histamine drug, the treatment of tetanus with large repeated intramuscular injections of serum is in no way superseded by the additional techniques here discussed; indeed it is still one of the sheet anchors of treatment. Rapid desensitisation by multiple injections of increasing strength can be achieved if the initial test dose of serum gives a positive reaction.

Antibiotics.—Penicillin is clearly indicated as long as active signs of clinical tetanus persist. Other antibiotics may be required to prevent respiratory complications.

Excision of wound.—When the wound was explored in both patients *Cl. tetani* was isolated. This fact re-emphasises the need to explore even the most trivial wound in every patient with tetanus.

Fluid balance.—It was possible for most of the time to give adequate fluids, electrolytes, vitamins, and a high-calorie diet by stomach-tube. In both patients gastric function failed temporarily soon after the start of treatment with tubocurarine and I.P.P.R. Possibly cessation of normal diaphragmatic movement plays a part in this failure. During this period large quantities of fluid had to be aspirated from the stomach; hence the electrolyte requirements had to be carefully watched and supplied.

General Supervision

During the treatment of case 1 by I.P.P.R. a "shift" system was instituted by which a doctor was always present with the patient throughout the twenty-four hours; but during the treatment of case 2 by I.P.P.R. we relied instead on third-year student nurses, because we thought that the disruption of the work of a busy hospital which a shift system causes was unjustifiable. These nurses gave all the routine treatment, including tubocurarine and tracheobronchial toilette, in a highly efficient manner. A system of alarm bells was installed so that in an emergency medical help would be immediate, but this was never used.

Active Immunisation

Finally, we emphasise that, in rural areas particularly, there is still a small but recurring morbidity and mortality from tetanus. More widespread use of active immunisation in childhood in such areas is most strongly to be recommended.

Summary

The detailed treatment of two children with severe tetanus by complete paralysis and intermittent positive-pressure respiration is described.

These additional techniques in no way supersede the established forms of treatment—e.g., large repeated intramuscular injections of antitetanic serum.

Whatever recovery-rate may be achieved even in severe cases of tetanus, more widespread use of active immunisation in childhood, especially in rural areas, is strongly recommended.

We wish to record our thanks to our colleagues who have been mentioned in the text, and also to Dr. W. J. Walter, Dr. G. S. Steele-Perkins, and Dr. Butler, consultant anæsthetists; to Dr. N. S. Alcock, consultant neurologist; and to Dr. P. C. Gautier-Smith, resident medical officer; and to all the other members of the resident medical staff, all of whom were involved directly or indirectly in the care of these patients. Our thanks are due also to Sister Ashby and the nurses, to the physiotherapists, and to Mr. Berry, who maintained the apparatus.

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PERCUTANEOUS INTUBATION OF THE FEMORAL VEIN FOR TRANSFUSION

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INTRAVENOUS transfusion is usually made through a suitable needle inserted into a vein of the arm or the leg. When this method is unsuccessful or a prolonged transfusion contemplated, a vein may be exposed through a small incision and a cannula tied in. Neither method is without disadvantages. The use of a needle entails immobilisation of the limb, and thrombosis of the vein is a not uncommon sequel. Further, when blood is given, the transfusion rarely runs for more than twenty-four hours. Cannulation of the vein entails its ligation and ultimate obliteration. Neither method can be used with safety for vesicants or strong dextrose solutions, and both may fail where profound shock is accompanied by intense constriction of the peripheral veins.

The ease with which a small nylon catheter may be inserted into a vein in the arm (Verel 1954) suggested that a larger catheter might be of value for blood-transfusion. Russell et al. (1954) had used a polyethylene tube inserted into the femoral vein by cut-down in the management of anuria and found it remained patent for many days. The femoral vein is easily punctured and had been used on several occasions for obtaining blood samples from severely shock subjects. A technique was therefore devised for inserting a large catheter into the femoral vein through a suitable needle.

Materials

Nylon tubing into which a standard blood-transfusion needle would fit was first obtained ('Portex' no. 3 or 'Becton Dickinson' 0·65 in. are suitable). Three sizes of stainless-steel tubes were then prepared:

(1) A cannula 3·5 cm. long fitting into the tubing easily but without leaks;

(2) A cannula 3·5 cm. long fitting the tubing very tightly; and

(3) A needle through which the nylon tubing passed easily but not loosely (this was ground to a sharp bevel and fitted for convenience of handling with a Luer hub).

Method

The needles are dry-sterilised in individual glass tubes. The nylon tubing is cut as needed and boiled in a bowl or autoclaved before use. It should not be picked up with forceps when warm, because this may pinch it flat. For most purposes a 20–25 cm. length is used; one end is cut square and the other with a 45° bevel.

A trolley is laid out with 3 sterile towels, 2 syringes of 5 ml. capacity, several intradermal needles, a 5 cm. 19-gauge needle, and ampoules of physiological saline solution, heparin, and 2% procaine solution. A 5 ml. syringe is first filled with physiological saline solution containing a drop or two of heparin and the small cannula is attached to it. The square-cut end of the tubing is then threaded on to this, the cannula is filled with heparin-saline mixture, and the bevelled end is passed through the introducing needle to make sure that sterilisation has not affected the fit of the tubes (polyethylene tubing is unsuitable because it swells on boiling and tends to split when cannulæ are pushed into it). A second 5 ml. syringe is then filled with 2% procaine, and a short intradermal needle is attached to it.

The patient is then laid supine, with only the head raised on pillows. (For orthopnœic patients the head of the bed is raised on blocks.) The thigh on the side to be intubated is then abducted to about 45° to the trunk and everted so that it lies easily on the bed. The pubic tubercule is then identified, and

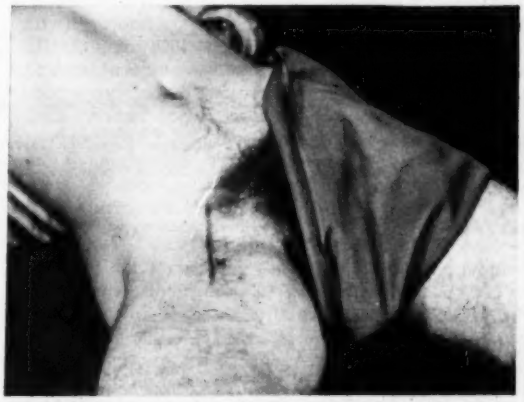

Fig. 1—Thigh positioned for intubation. Line of femoral artery marked with a skin pencil; cross shows approximate site for infiltration with local anæsthetic.

the course of maximal pulsation of the femoral artery is marked clearly on the skin from the point at which pulsation can be felt above Poupart's ligament to at least 12 cm. below it (fig. 1). Once this has been done, the patient's thigh is not moved until the transfusion is running.

A point is then selected 4–5 cm. below Poupart's ligament and 5–8 mm. medial to the line of maximal arterial pulsation. After the skin has been carefully cleaned, the skin and subepithelial tissues are infiltrated with about 2 ml. of local

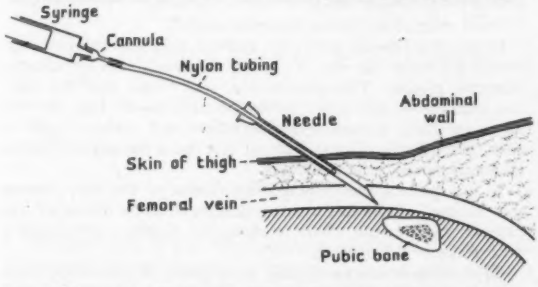

Fig. 2—Femoral vein pierced by introducing needle: point of needle lies within femoral vein, and nylon tubing is in needle and connected to syringe by easily fitting cannula.

anæsthetic. The 5 cm. 19-gauge needle is then attached to the syringe and, through the same puncture, introduced at an angle of 45° to the skin, advancing upwards towards Poupart's ligament parallel to the artery but 5–8 mm. medial to it. Each time the needle-point encounters a fascial plane the advance is halted and the syringe held lightly to see if any transmitted pulsation indicates that the artery lies beyond the needle. If none is felt and aspiration yields no blood, 0·5 ml. of local anæsthetic is injected, and the needle is advanced to the next point of resistance until either the femoral vein is encountered

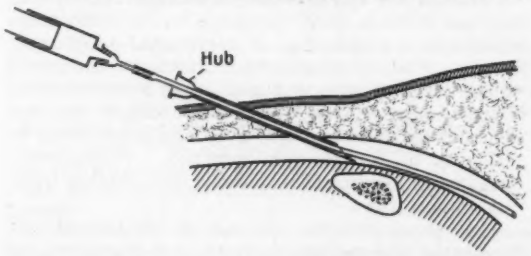

Fig. 3—Needle depressed until hub touches thigh, and tubing passed through needle until syringe and cannula are close to needle-hub.

or bony resistance is felt. If bone is encountered, the needle is carefully palpated to determine whether it has passed between the artery and vein or medial to the vein, and, after withdrawing the needle into the superficial tissues, a corrected direction is tried. Should the artery be entered by mistake, it is easily distinguished by the colour of the blood. Blood-pressure may be misleading because, if the patient is lying with the head of the bed raised, the pressure in the femoral vein is enough to force the plunger of the syringe out. Once the femoral vein has been identified, the angle and depth of the needle in relation to the line of the artery marked on the skin are carefully noted.

Sterile towels are then applied so that only a small area round the site of the injection is exposed. An assistant prepares a transfusion set, attaching the large cannula to the nipple of the set. The catheter with attached syringe and introducing needle is now laid on the sterile towel and drawn back so that its tip lies within the introducing needle. The needle is then

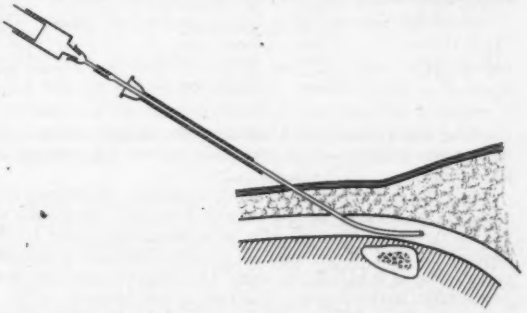

Fig. 4—Introducing needle withdrawn with syringe and cannula. Assistant now fixes tubing where it enters skin by firm pressure while cannula is withdrawn and needle removed.

pushed through the skin at the site of the local infiltration, the needle being held in the line of the artery and almost parallel to the skin of the thigh because considerable force is needed to penetrate the dermis and, if this is attempted with the needle at 45°, all tissues down to the pubic bone may be suddenly transfixed. (Alternatively the needle may be introduced through a puncture made with a small tenotome.) The needle is then drawn back until only its tip is within the skin, and it is

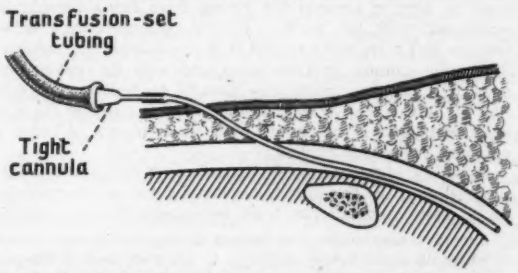

Fig. 5—Tightly fitting cannula connected to transfusion set is now inserted into nylon tubing, and transfusion is started. Nylon tubing is then pushed well up into vein, and cannula and transfusion-set tubing are taped to skin.

raised to 45°. The position of the artery is checked by palpation, and the needle is gently advanced until the first resistance is felt. If there is no transmitted pulsation and aspiration by the syringe on the end of the tube produces no blood, the needle is pushed on and the aspiration repeated. The sequence of advance, pause to check for pulsation, and then aspiration is repeated until venous blood is drawn into the tubing, indicating that the femoral vein has been entered (fig. 2). (Usually the vein wall causes moderate resistance, and the ease with which the needle can be advanced in the lumen of the vessel is recognisable.) The blood is then ejected from the tubing by

PATIENTS TRANSFUSED INTO FEMORAL VEIN

Case no.	Duration of transfusion	Volume transfused	Nature of fluid	Diagnosis	Indication for use of tubing
1	3 days	7 pints	Blood	Hæmorrhage from œsophagus	Profound shock; no peripheral vein suitable
2	1 day	3 pints	Blood	Hæmolytic anæmia	No suitable vein remained
3	1 day	3 pints	Blood	Ulcerative colitis	Previous cut-down; no suitable superficial vein
4	1 day	2 pints	Blood	Emphysema, peripheral circulatory failure	Profound shock; no peripheral vein suitable
5	6 days	20 pints	Electrolyte, glucose and packed cells	Anuria	Election
6	2 hr.	½ pint	Saline solution and N_2 mustard	Hodgkin's disease	Previous thrombosis of forearm vein
	,,	,,	,,		
	,,	,,	,,		
	,,	,,	,,		
	1 day	,,	Saline solution, N_2 mustard, and blood 3 pints		
7	2 days	7 pints	Packed cells	Chronic gastrointestinal hæmorrhage; heart-failure	Election
8	1 day	4 pints	50% glucose, electrolytes	Pulmonary tuberculosis, anuria following hæmorrhage	Election
9	8 hr.	2½ pints	Blood	Gastrointestinal hæmorrhage	Profound shock; no peripheral vein suitable
10	½ hr.	100 ml.	50% sucrose	Raised intracranial pressure	Poor peripheral veins
11	5 days	6 pints	Blood	Hæmatemesis	Election
		8 pints	Electrolytes	Pyloric stenosis	
12	12 hr.	3 pints	Packed cells	Acute leukæmia	Election
13	12 hr.	3 pints	Blood	Acute hæmorrhage	Profound shock
14	24 hr.	2 pints	Blood	Postoperative transfusion	Election
		3 pints	Electrolytes		

injecting heparinised saline solution, the syringe being held so that any bubbles which may have entered are retained in the syringe.

The tubing is now pushed gently forwards. Sometimes the tube will pass easily up the femoral vein with the needle at 45° to the skin. More usually, after advancing about 1 cm. beyond the end of the needle, it sticks although aspiration reveals that it is still in the vein. This arrest is probably due to the acute angle of entry. The tube is withdrawn a few mm. and the needle-hub lowered to the level of the skin of the thigh, a single layer of sterile towel only separating the two. In this position the tube is passed in until only 1 cm. remains outside the introducing needle (fig. 3).

The end of the tubing with the narrow cannula and the introducing needle are now gripped firmly, and the introducing needle is withdrawn until about 0·5 cm. of the tubing is visible between the needle-tip and the skin (fig. 4). An assistant then fixes this by firm pressure with a swab over the puncture. The narrow cannula is now drawn out of the tubing and the introducing needle slipped off. The tubing slides easily in and out of the skin puncture; so a careful watch at this stage must be kept to prevent the tubing from being completely pulled out with the needle. During this manœuvre saline solution and then blood should flow freely from the catheter. The large cannula is then connected and the transfusion started. The nylon tubing may then be pushed into the vein (fig. 5). The tubing of the transfusion set is taped to the skin in three places. If blood still leaks from the site of entry, a collodion dressing is applied.

At the end of the transfusion the catheter is removed and light pressure over the puncture is applied for one or two minutes. In all cases a nurse has been responsible for its removal.

Note: Two cannulæ are used because the large one is tight enough to dilate the nylon tubing slightly. If this were used in the preliminary stages it would prevent the removal of the introducing needle at the end of the intubation.

Results

Details of the first 18 occasions on which femoral-vein intubation was used are shown in the accompanying table. Its use was originally restricted to patients in whom conventional methods were impossible, but it has proved so convenient that it is now preferred to both cut-down and simple transfusion with an intravenous needle in any patient in whom the transfusion is expected to run for more than twenty-four hours.

The tubing has proved suitable for transfusing stored blood, packed cells, electrolyte and glucose solutions, and nitrogen mustard without mishap.

The puncture in the femoral vein was identified in case 8, who died twenty-four hours after the transfusion was set up. There was a clean hole in the intima without any surrounding thrombosis or any subcutaneous extravasation of blood.

Three colleagues have used the method successfully on their own patients and prefer it to cutting down on a vein.

Some difficulties have been encountered.

In the first case in which the method was tried the catheter would not enter the vein, although the needle was apparently correctly placed. The patient was very obese, and the vein was punctured only when the introducing needle had entered up to the hub. A longer needle (9 cm.) was made for use in such patients when it was realised that the acute angle of entry might cause the catheter to stick.

In one patient the catheter slipped out of the vein during the removal of the introducing needle. Careful fixing of the catheter by pressure where it enters the skin has prevented a recurrence of this mishap.

In several instances during transfusion of blood the flow ceased. On all of these occasions the tubing was patent, and the block was found in the transfusion set, except in one case where the transfusion stopped at another hospital and the site of the block was not identified.

The longest transfusion in this series ran for six days. The tubing may be used for much longer periods, however. In one patient with anuria a similar transfusion was set up into an arm vein. It was used for giving blood and solutions of dextrose and electrolytes for more than three weeks. When the tubing was removed because it was no longer needed, there was no evidence of blockage or of venous thrombosis.

7 patients who had previously been transfused by conventional methods were questioned by an independent observer after transfusion. Five expressed a preference for the use of the femoral-vein intubation, one would express no preference, and case 2 had a strong dislike of the femoral-vein approach. Since case 2 had been subjected elsewhere to twenty-five transfusions mostly by cut-down, no suitable vein remained. Fortunately a remission in her hæmolytic anæmia made further transfusion unnecessary.

The nurses preferred the use of the femoral vein because the patient retained the use of all four limbs, and all ordinary nursing care, including the use of the bedpan and blanket bathing, was possible; patients fed themselves

and slept comfortably on their sides if they wished; no patient turned over on to the tubing in his sleep, because the firm attachment by sticking-plaster to the unshaven thigh woke them if they tried to do so. The ease with which patients could be moved is well illustrated by 2 instances: case 5 was transferred by ambulance for fifteen miles to another hospital, the transfusion being continued during the journey; and gastroscopy was performed on case 11 during transfusion.

Summary

A technique for passing a nylon tube into the femoral vein through an intravenous needle is described. The tubing has proved suitable for transfusing whole blood, packed cells, and solutions of electrolytes, glucose, 50% dextrose, and nitrogen mustards.

No complications were encountered. During transfusion the patients may move freely and may be transported by ambulance. Gastroscopy was done on one patient during transfusion.

The method is simple and provides a certain method of transfusion in severe shock, where venous spasm may render conventional methods ineffective. It is now preferred to tying in a catheter and simple needle insertion in any patient in whom transfusion is expected to last more than twenty-four hours.

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RECURRENT FACIAL EMPHYSEMA

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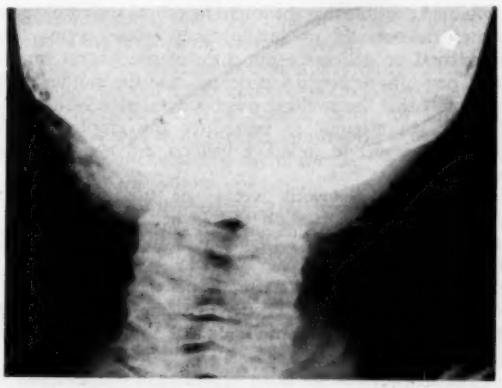
EMPHYSEMA of the subcutaneous tissues of the face and neck usually results from a traumatic or surgical opening in the wall of the mouth, œsophagus, or respiratory tract. Commonly the air reaches the face by upward spread from mediastinal emphysema or from extensive collections of air in the chest wall. Emphysema confined to the face and neck is relatively uncommon and is usually a complication of tracheotomy, bronchography by the cricothyroid route, dental extractions or operations (Brown 1949), or puncture of the antrum.

Spontaneous mediastinal emphysema is rare (Matts 1957) and spontaneous emphysema of the face even rarer, but Jackson and Jackson (1936) wrote: "subcutaneous emphysema occurs spontaneously in a few cases probably the result of rupture of the mucosa of the upper air and food passages."

A curious type of facial emphysema was described by Reading (1950) under the title of "autemphysesis": a German prisoner-of-war produced extensive emphysema of the face and neck by means of a small incision on the inner side of the left cheek. The patient stated that this could be produced by a razor-blade or by nipping the cheek between the molars. Air was then forced into the tissues of the neck by expiration with the mouth closed and nose pinched between finger and thumb.

Similar cases were observed during the Middle East campaign, and a medical directive was sent out to warn medical officers to look out for these cases, which presented like mumps.



Emphysema of subcutaneous tissues on right side of neck.

In the case described here we could not find any cause for the emphysema, and we publish the case partly because of its intrinsic interest and partly because we hope that others may be able to explain the recurring emphysema.

Case-report

A girl began, at the age of $8\frac{1}{2}$ years, to have episodes of swelling of the face. During the first attack she was thought to have mumps, but the recurrence of the swelling at intervals of about a fortnight excluded this diagnosis. The swelling affected either side of the face but only once occurred simultaneously on both sides, and seldom lasted more than two or three days. The swelling was greatest over the parotid region in the first attacks. There was no pain, but the girl occasionally complained of discomfort in the ears and of "crackling in the gums". The significance of the crackling sensation was not appreciated until the correct diagnosis had been made. The attacks always came on when she was upset at school, which she did not like. Apart from this there was no indication of a possible cause of the swelling.

On Aug. 11, 1956, at the age of 9 years, she was referred to the pædiatric outpatient clinic at the Greenock Royal Infirmary. At this time there was no swelling, and recurrent parotitis was provisionally diagnosed. The regions of the parotid glands and ducts were radiographed, but no calculi were found. In view of the absence of any residual enlargement of the parotids and in view of the painlessness of the swelling during the attacks, the diagnosis of recurrent parotitis did not seem wholly satisfactory, and it was suggested that she should be seen again when the swelling was present.

She was seen at her home on Oct. 2, 1956, when she had a swelling of the right side of her face, mainly in the parotid and infraorbital regions. Pressure over the parotid gland did not cause pain. Pressure on the inner side of the right cheek produced the crackling sensation of subcutaneous emphysema, and this was also present over the parotid gland and in the upper part of the neck. A search was made for a lesion of the inner surface of the cheek, but none was found. The gums and teeth were healthy, and there had been no recent dental extractions. Radiography of the face, neck (see figure), and chest showed that the air was confined to the face and upper part of the neck on the right side. There was no evidence of mediastinal emphysema or of pneumothorax.

Later, when the swelling had subsided, the girl's teeth were examined, and Mr. Ian Munro examined her ears, nose, and throat. No abnormality was discovered, and radiography of her sinuses, maxillæ, and lower jaw was also quite normal.

Discussion

The only clue to the cause of the emphysema was the association between emotional tension at school and the onset of swelling. Since the child did not like her school,

it seemed possible that she might be producing emphysema either deliberately or involuntarily while crying. An accidental or deliberate puncture of the buccal mucosa with pen-nibs or pencil was denied, and the mother stated definitely that the swelling was not associated with crying. Finally, an attempt to reproduce the emphysema by getting the girl to inflate a balloon did not cause any swelling of her face.

During the following weeks she continued to have recurrent attacks of emphysema when she was upset at school. In November, 1956, the Education Committee was asked to change her school. When last seen in October, 1957, she had started at her new school and was quite happy. Since her change of school she has had one brief episode of the emphysema due to coughing during an attack of influenza.

There was thus no discoverable mechanical cause for the emphysema and no explanation for its association with emotional tension or for the appearance of the swelling on either side of the face.

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Preliminary Communications

THE EFFECT OF HUMAN GROWTH HORMONE IN MAN

THE metabolic effect of growth hormone (GH) has been extensively studied in animals.[1] In contrast, very little is known about the significance of GH in man. GH purified from animal pituitaries has been used in metabolic studies in man, but the results obtained were either negative or inconclusive.[2] It was shown later by Li and Papkoff [3] that GH purified from human pituitaries differs in chemical structural properties from the hormone purified from animal glands, and the behaviour of animal GH in man could be explained on this basis.

TABLE I—RESULTS OF BIOLOGICAL ASSAY OF HUMAN GROWTH HORMONE

Preparation	Total dose (μg.)	No. of assay rats	Average tibia width* (μ)
84/57	20	5	190 ± 5·3
84/57	80	5	226 ± 6·7

* Mean ± standard error.

In this communication we report preliminary results of metabolic studies on two volunteers given GH purified from human pituitaries. Case 1 was a 35-year-old male, who had for many years suffered from rheumatoid arthritis, which had been clinically inactive for at least 8 years. Case 2 was a male of 45, who had previously been treated for obesity. His body-weight for the past three years had been 92 kg., and his height 185 cm.

The metabolic studies involved standard procedures, using four-day collection periods for fæces and daily ones for urine.

GH was given intramuscularly in a single daily dose of 10 mg.; case 1 received injections for 12 and case 2 for 16 days.

TABLE II—CUMULATIVE BALANCES OF NITROGEN, PHOSPHORUS, POTASSIUM, AND CALCIUM DURING ADMINISTRATION OF GROWTH HORMONE

—	Case 1	Case 2
Given GH for	12 days	16 days
Nitrogen balance (mg.)	+40284	+40320
as protein in protoplasm (g.)	252	252
as fat-free protoplasm (g.)	1289	1290
Phosphorus balance (mg.)		
calculated from nitrogen	+ 2686	+ 2688
actual balance	+ 2116	+ 2032
net balance (in relation to nitrogen)	− 70	− 656
Potassium balance (mEq.)		
calculated from nitrogen	+ 109	+ 109
actual balance	+ 302	+ 186
net balance (in relation to nitrogen)	+ 193	+ 77
Calcium balance (mg.)		
urine	− 888	− 720
fæces	+ 1572	− 1216
Total	+ 684	− 1936

Preparation of Growth Hormone

GH was purified from lyophilised human pituitaries, collected at necropsy, according to the chromatographic method of Li and Papkoff.[3] The hormone content of the material was estimated qualitatively and quantitatively by zone electrophoresis on starch; and it was assayed biologically in hypophysectomised rats by the tibia test [4] (see table I).

When the GH preparation was submitted to zone electrophoresis on starch in a veronal buffer (0·01 M hydrogen veronal, 0·04 M sodium veronal, and 0·06 M NaCl) of pH 8·3 it migrated as a single protein. No material remained stationary at the origin. The GH preparation was easily dissolved in saline after adjusting the pH to around 7·0.

RESULTS

Protein metabolism.—The cumulative balances of nitrogen, phosphorus, and potassium during the treatment period are shown in table II. In both patients a positive balance was obtained for all three elements. The nitrogen retained in both corresponded to about 1·3 kg. of fat-free protoplasm. Potassium was retained in excess of the figure calculated from the nitrogen balance, while the phosphorus retained largely corresponded to the calculated amount. The excess potassium corresponds to 1·3 and 0·5 kg. of "wet glycogen" in case 1 and 2 respectively.

Calcium balance (table II).—In both patients the urinary excretion of calcium increased. The fæcal excretion of calcium, on the other hand, changed in opposite directions in these patients.

Sodium and chloride balances (table III).—Both patients retained sodium and chloride, and increased their extracellular fluid volume as measured by the volume of distribution of chloride. Both sodium and chloride were

TABLE III—CUMULATIVE BALANCES OF SODIUM AND CHLORIDE AND CHANGE OF THE CHLORIDE SPACE DURING ADMINISTRATION OF GROWTH HORMONE

—	Case 1	Case 2
Given GH for	12 days	16 days
Chloride space (litres)	+1·8	(+1·0)
Sodium balance (mEq.)		
calculated from chloride space	+261	+145
actual balance	+397	+328
net balance (in relation to chloride space)	+136	+183
Chloride balance (mEq.)		
calculated from chloride space	+180	+100
actual balance	+252	+144
net balance (in relation to chloride space)	+ 72	+ 44

1. Ketterer, B., Randle, P. J., Young, F. G. *Ergebn Physiol.* 1957, **49**, 127.
2. Shorr, E., Carter, A. C., Smith, R. W., Jr., Kennedy, B. J., Havel, R. J., Roberts, T. N., Soskin, L. L., Livingstone, E. T., *in* The Hypophyseal Growth Hormone. Edited by Smith, R. W., Gaebler, O. H., Long, C. N. H. New York. 1955.
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4. Greenspan, F. S., Li, C. H., Simpson, M. E., Evans, H. M. *Endocrinology*, 1949, **45**, 455.

retained in excess of the retention calculated from the change in extracellular volume. It should be mentioned that in both patients perspiration increased during the treatment period.

The rapidity of the changes in the balances induced by GH administration and withdrawal is illustrated in fig. 1.

Other metabolic effects.—In case 1 there was a striking increase in the urinary excretion of acetone, and a disappearance of a pre-existing creatinuria (fig. 2). Discontinuation of the hormone was followed by a return of acetone excretion to the pretreatment level, while the creatine excretion increased far above the level of the control period.

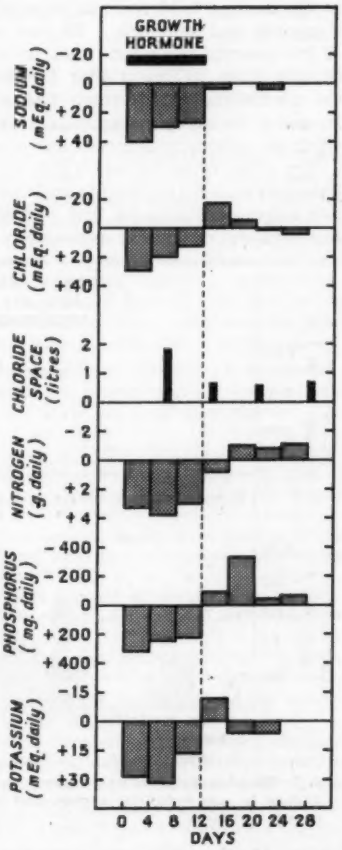

Fig. 1—Changes in the balances of nitrogen, phosphorus, potassium, sodium, and chloride and the volume of distribution of chloride during and after administration of growth hormone in case 1.

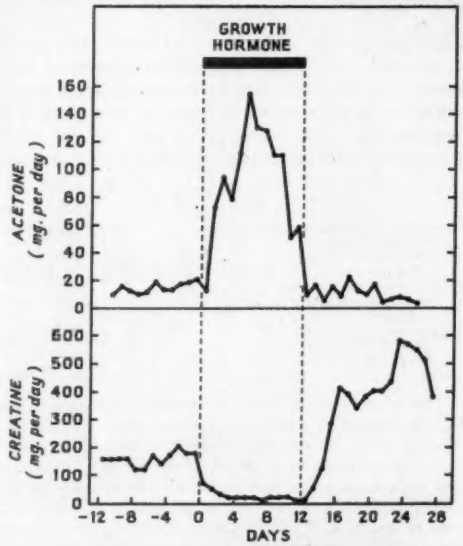

Fig. 2—Urinary excretion of acetone and creatine before, during and after administration of growth hormone in case 1.

In case 2 the creatine excretion was normal, and did not change, nor did the excretion of acetone change during GH administration. The plasma levels of inorganic phosphate as well as of sodium, potassium, chloride, and calcium were unaffected by the hormone.

Clinical effects.—Both patients, especially case 1, showed increased perspiration, transient nervousness, and tachycardia as well as a feeling of satiety. Furthermore, their daily consumption of water increased and the urine volume decreased. No rise in temperature was noted, and blood-pressure remained unchanged. There was no reaction at the site of injections.

SUMMARY

Growth hormone purified from human pituitaries had a pronounced metabolic effect in two human subjects. A daily dose of 10 mg. produced retention of nitrogen, phosphorus, and potassium; retention of sodium and chloride together with an increase in the extracellular space; and increase in the urinary excretion of calcium. In one of the subjects the excretion of acetone in the urine increased greatly and the creatine excretion, which was abnormally high, fell to normal during the hormone administration.

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EFFECT OF HUMAN GROWTH HORMONE IN HYPOPHYSECTOMISED DIABETIC SUBJECTS

THE "diabetogenic" effect of pituitary growth hormone (GH) in animals has been well documented [1–3] but very little is known about this "diabetogenic" effect in man. GH purified from animal pituitaries has been used in metabolic studies in man, but the results obtained were either negative or inconclusive.[4] It was shown later by Li and Papkoff [5] that GH purified from human pituitaries differs in chemical and structural properties from the ones purified from animal glands.

In the previous communication [6] we showed that human GH was metabolically active in man. In order to investigate the "diabetogenic" action of human GH, its effect on three hypophysectomised patients with diabetes mellitus was studied.

The patients were a 35-year-old male (case 1) and two females aged 28 and 25 years (cases 2 and 3). All three had been hypophysectomised for about four, three and a half, and three and a half years respectively because of severe vascular complications (retinopathy, nephropathy, and neuropathy). Case 1 was receiving at the time of the present study a standardised diet and 48 I.U. of insulin Leo retard. Cases 2 and 3 were studied under the conditions of a complete metabolic study. The insulin requirements were 24 I.U. 'Novolene' for case 2

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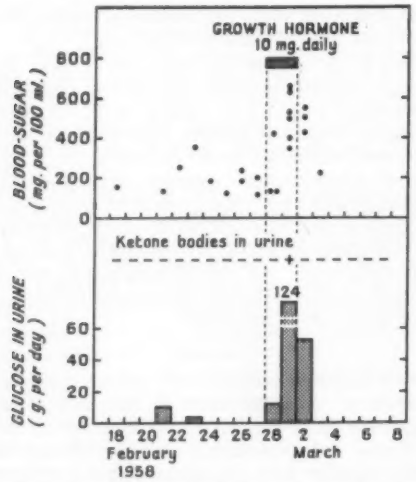

Fig. 1—Blood-sugar level and urinary excretion of acetone and glucose in case 1 before, during, and after administration of growth hormone.

and 24 I.U. protamine zinc insulin for case 3. Their remaining substitution therapy was as follows:

	Case 1	*Case 2*	*Case 3*
Cortisone (mg. per day)	50	25	25
Thyroid extract (mg. per day)	120	120	120

The GH used was prepared as previously described.[6] Biological assay in hypophysectomised rats by the tibia test [7] gave the following results:

Preparation	*Total dose (μg.)*	*No. of assay rats*	*Average tibia width* (μ)*
325/58 ..	25 ..	4 ..	219±10·1
325/58 ..	100 ..	4 ..	279±12·2

* Mean ± standard error.

The GH preparation was easily dissolved after adjusting the pH to about 7·0. GH was administered in a daily dose of 10 mg. at 8 A.M. The duration of administration is shown in figs. 1–3. No fever or local reaction at the site of injections were observed.

RESULTS

In cases 1 and 2 (figs. 1 and 2), the administration of growth hormone was followed immediately by a deterioration of the diabetic state as demonstrated by the increase in blood-sugar level and the appearance of pronounced glycosuria and ketonuria. Because of the deterioration of the patients' condition, extra insulin had to be given in both cases 36 hours after the first injection of GH, the administration of which had to be discontinued. In case 2, GH was given again 12 days later, and the same effect on carbohydrate metabolism was obtained.

The effect of GH in case 3 (fig. 3) was similar though less pronounced. Glycosuria and blood-sugar concentration increased during the first 24 hours, but pronounced ketonuria did not appear as promptly as in the other two cases. On the other hand, even here the administration of GH had to be stopped on the eighth day because the patient's general condition had deteriorated so much.

7 Greenspan, F. S., Li, C. H., Simpson, M. E., Evans, H. M. *Endocrinology*, 1949, **45**, 455.

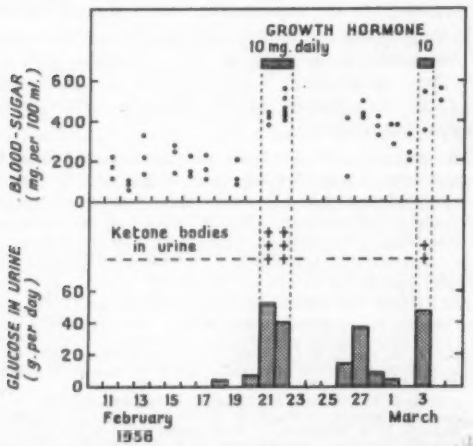

Fig. 2—Blood-sugar level and urinary excretion of acetone and glucose in case 2 before, during, and after administration of growth hormone.

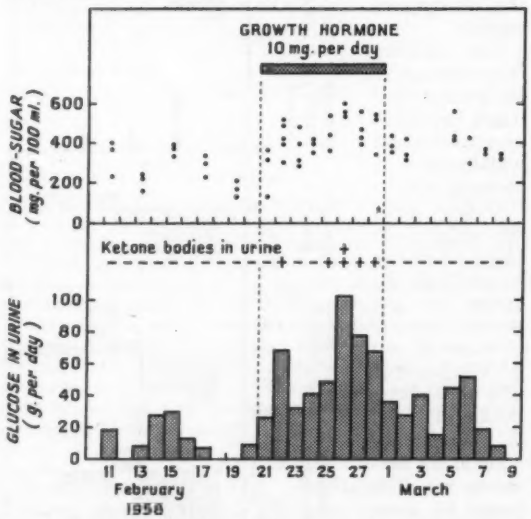

Fig. 3—Blood-sugar level and urinary excretion of acetone and glucose in case 3 before, during, and after administration of growth hormone.

SUMMARY

Growth hormone purified from human pituitaries was administered to three hypophysectomised diabetic patients. In all three the hormone administration was followed by a pronounced increase in blood-sugar level, glycosuria, and acetonuria. In two of the patients, the administration had to be stopped after 36 hours.

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"The adult, having asked a question, can hardly sustain sufficient interest in it to listen to the answer. He may answer it himself or go on to some other irrelevant question. If he can summon the effort to listen to the answer, he is likely to forget it as soon as he has heard it. The child, strange and unaccountable as it may seem to us, asks a question because he really wants to know the answer. Stranger still, he will listen carefully to a genuine answer, and, strangest of all, if it is genuine, he will remember it."—JOHN COHEN, PH.D. *Humanistic Psychology*. London, 1958.

New Inventions

MODIFICATIONS OF A SPIROMETER FOR TIMED CAPACITY AND MID-EXPIRATORY FLOW MEASUREMENTS

THE percentages of the total vital capacity expired in 1, 2, and 3 seconds indicate the degree of obstructive impairment of ventilation (Gaensler [1]). Leuallen and Fowler [2] have shown the additional value of measurement of mid-expiratory flow-rates in early emphysema. We describe here a simple modification of a spirometer in general use, which records the total vital capacity and any volume expired during a pre-set time-interval of 0·1–3·0 sec. (in a similar fashion to the modification described by Gaensler) but in addition permits easy and rapid calculation of flow-rates from the start of mid-expiration.

The only alteration to the ordinary spirometer is the insertion of a pin into the top of the counterweight to project horizontally through the slot in the counterweight cylinder. The extra attachments (see figure) are:

(1) A solenoid mounted on the bracket supporting the recording disc, in such a way that its rod holds the pointer. When the solenoid is energised from the timer, the rod is raised and the pointer released.

(2) A fixed microswitch mounted above and to the side of the counterweight and kept open, when the counterweight is at its highest position, by the counterweight pin.

(3) A second microswitch, mounted on the side of the counterweight cylinder, can be moved on a scale calibrated downwards from 0 to 1600 c.cm.

(4) A third switch, mounted above the fixed microswitch, determines which of the two microswitches is brought into operation.

(5) An electronic timer graduated from 0·1 to 3·0 sec. can be energised by a momentary electrical impulse.

The end of the bracket supporting the recording disc acts as an indicator for the total vital capacity. For timed capacity, the timer is set to the interval required, and the fixed microswitch is brought into operation. As the spirometer bell rises, the counterweight descends, its pin closes the microswitch, and the timer is actuated. The pointer is held until it has registered the amount expired during the set interval, after which the solenoid rod is raised and the pointer released to travel round with the disc. For flow-rates from the start of mid-expiration, the movable microswitch is brought into operation and is then set to a position on the scale corresponding to a quarter of the total vital capacity. This amount is therefore expired before the counterweight pin closes the microswitch. Consequently the pointer registers the first quarter of the vital capacity together with the amount expired during the interval, after the first quarter, for which the timer is set (0·1–3·0 sec.). By subtraction of the quarter of the vital capacity it is easy to calculate flow-rates from the start of the mid-expiratory phase.

Timed capacity could, of course, be estimated solely by setting the movable microswitch to 0 on its scale. On this machine two microswitches have been included to avoid having to set the movable microswitch to 0 after every estimation of mid-expiratory flow, and to avoid repeated settings of it, if it is desired to estimate the value of timed capacity after the expiration of certain fixed amounts.

This modified spirometer is proving of use as an aid to clinical assessment, but it is hoped that its main value will be in the early diagnosis of emphysema and estimation of its progress, by enabling routine serial observations to be made on patients under supervision with chronic chest disease. Its simplicity of operation is a great advantage in outpatient work, where observations have to be made on many patients in a short time. At this clinic health visitors have been trained in its use and make most of the estimations. As it is an adaptation of equipment already in use, unnecessary expenditure has been avoided.

The modifications were made by Messrs. Venner Electronics, Ltd., New Malden, Surrey, and our thanks are due to Mr. D. R. Ollington for his help.

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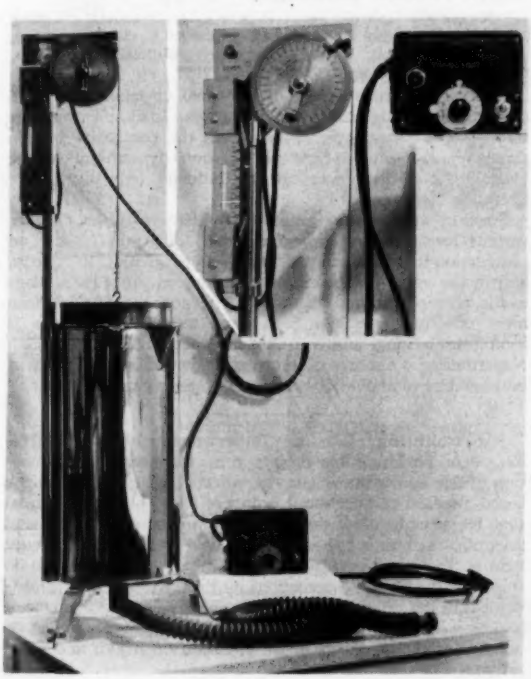
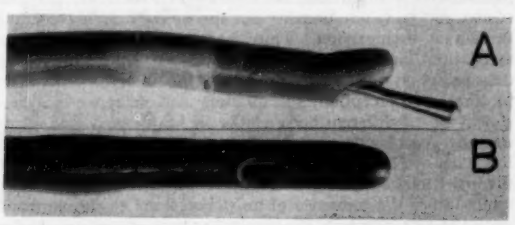


A MODIFIED FOLEY CATHETER

THE soft latex-rubber Foley self-retaining catheter is probably the most popular instrument for continued drainage of the bladder, but, unfortunately, in some cases its pliability makes its passage through the prostatic urethra impossible.



To overcome this difficulty, a metal introducer is often used but, with the standard pattern of catheter, the tip of the introducer easily slips through the eye of the catheter and may injure the urethra (see figure, A).

A minor but useful modification of the catheter is shown in the figure, B. In this pattern the eyes of the instrument are receded 2 cm. from its tip; the end of the introducer sits comfortably within the cul-de-sac so formed without risk of displacement and can be used with complete safety.

The catheter was made for me by Messrs. Wm. Warnes and Co. and is a modification of the Warnes balloon catheter. I wish to thank Mr. E. L. Tugwell for the photograph.

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Reviews of Books

An Introduction to Chest Surgery

GEOFFREY FLAVELL, F.R.C.S., M.R.C.P., thoracic surgeon, The London Hospital. London: Oxford University Press. 1957. Pp. 354. 30*s*.

THE rapid advance of chest surgery has made many books on this subject out of date before they are published, and it is hard to find one which can give the student and practitioner (as distinct from the expert) an accurate picture of current practice.

Mr. Flavell and his publisher are to be congratulated on providing in this book the maximum information at the minimum cost. The approach is practical, and after short introductory sections the author embarks straightway on how to look at a chest X ray, bronchoscopy, and pulmonary resections.

The various conditions which may call for surgery are concisely discussed, and a number of short case-histories are added, to show how errors in diagnosis and treatment can arise and how they should have been avoided. In the discussion on the diagnosis of bronchial carcinoma Mr. Flavell points to an important fact: even as recently as 1954 there was an average delay of over eight months between the first symptoms and surgical removal of the growth; and only one to two months' delay could be attributed to the patient. Apart from diseases of the lung, there are adequate sections on the œsophagus and heart which discuss those conditions that can be treated surgically. The final chapter, on mitral stenosis, is an admirable description of the disease and its possible remedy. Clear line drawings and several pages of small but good X-ray reproductions illuminate the text.

Here and there are matters about which other thoracic surgeons might disagree; but the balance of the book and its easy style should make it very acceptable to the general reader. It gives an excellent picture of the scope of surgery in thoracic disease and provides much information that is not readily found in general medical and surgical textbooks.

The Dynamics of Anxiety and Hysteria

H. J. EYSENCK, PH.D., professor of psychology, University of London. London: Routledge & Kegan Paul. 1957. Pp. 312. 32*s*.

FROM time to time Professor Eysenck summarises in a book the work of his group at the Institute of Psychiatry (Maudsley Hospital). His latest instalment begins with a recapitulation of earlier work seeking to show that psychotic patients can be distinguished from those who are neurotic by their scores in a battery of objective tests, and that by further tests neurotic patients can be subdivided not only by their measurable degree of neuroticism or emotionality but also by their degree of introversion or extroversion. Thus, hysterical patients are more extroverted than persons with anxiety states. Professor Eysenck then passes on to a detailed analysis of the observed differences in learning, perception, socialisation, and response to drugs shown by the different personalities he has defined. He measures the ease of acquisition or extinction of conditioned reflexes involving eye blinking, the rate of dark adaptation, attitudes to divorce and the death penalty, and nonsense-syllable learning while under the influence of amylobarbitone or dexamphetamine; and he interprets the results in terms of a neo-pavlovian theory of cerebral excitation and inhibition.

The book is not easy reading. Its chief value lies in its discussion of the experimental methods used, and the references to the fuller published papers of the Eysenck school. The theory it proposes is still evolving, and unfortunately it appears so far to be moving along a different dimension from clinical psychiatry. The author himself admits that it seems oversimple to explain the phenomena of hysteria and anxiety. It must be added that the results on which it is based are statistical correlations between items of behaviour of groups of people. Measurement of items of behaviour of an *individual*, with quantitative prediction of his further responses, is what interests the clinician, and general statements of probabilities in groups are of little use. Professor Eysenck's ideas, however, have already stimulated a good deal of experimental work, and will provoke more; and that is sufficient justification for a scientific hypothesis. If they could be applied longitudinally instead of cross-sectionally (that is, if the measurements were repeated at different times in the life of the same individual) they might come to have practical relevance.

Bone Tumours

DAVID C. DAHLIN, M.D., consultant, section of surgical pathology, Mayo Clinic, Rochester, Minnesota. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1957. Pp. 224. 87*s*. 6*d*.

THIS is a study of 2276 consecutive bone tumours seen at the Mayo Clinic: and no praise could be higher than that Dr. Dahlin has done justice to such a rich source of material. Anybody writing on bone neoplasms must come to terms with several problems to which there are as yet no satisfactory solutions. Perhaps because there is often little correlation between the clinical course, histological structure, and radiological appearance of these growths, clinicians, pathologists, and radiologists have not yet agreed on a mutually acceptable nomenclature: and without a common language it is hardly surprising that they have evolved no satisfactory classification. Dr. Dahlin bases his on a system suggested by Liechtenstein: this has many features in common with Thompson and Turner-Warwick's classification and will be acceptable to most pathologists in this country. The cell type is used as the chief criterion in assigning a tumour to its group: this makes for histological accuracy, but it does not always favour clear distinction between what is clinically innocent and what is malignant.

Tumours arising from marrow elements have been included in the survey: malignant myelomas are, in fact, the largest single group. The scope of the investigation can be judged by the fact that no less than 88 chordomas have been examined and analysed. The lay-out and presentation of this vast material is impeccable: and the illustrations have been judiciously selected and beautifully reproduced. Dr. Dahlin reaches no startling conclusions; but as a basis for further study his book will prove invaluable.

Gastro-intestinal Obstruction

MEYER O. CANTOR, M.D., M.S., F.A.C.S., assistant attending surgeon; ROLAND P. REYNOLDS, M.D., F.A.C.S., chief of surgery, Grace Hospital, Detroit. Baltimore: Williams & Wilkins. London: Baillière, Tindall & Cox. 1957. Pp. 565. 144*s*.

EVERY conceivable aspect of intestinal obstruction is here covered in a monograph by expert authors. In a sapient preface they observe that, despite advances in the control of blood-chemistry by infusion and of infection by antibiotics, the mortality of obstruction can be reduced only by earlier operation.

Starting at the œsophagus, they discuss obstruction at various levels of the alimentary tract. Chapters follow on obstruction in special circumstances—in pregnancy, in infancy, and in the aged, for example—and then on procedures diagnostic, therapeutic, and operative. The work would have been more effective if it had been more concise. Emphasis is sometimes lacking, and it is hard at times to hold the thread. Nevertheless as a source of information, with nearly 40 pages of bibliography (and over 40 references on each page), it excels.

Air Pollution (London: Butterworth. 1957. Pp. 248. 42*s*.).—As Sir Hugh Beaver says in his foreword, " The question of Air Sanitation is one that affects the country from the social, medical and economic points of view; but it is essential that its consideration should be put on to a technical and scientific basis rather than an emotional one ". A conference held at Sheffield University in September, 1956, sought to do this; and the papers (here edited by Prof. M. W. Thring) discussed the nature, measurement, sources, course, consequences, and elimination of air pollution. Dr. John Pemberton gives an account of the ill effects of air pollution on health and vegetation.

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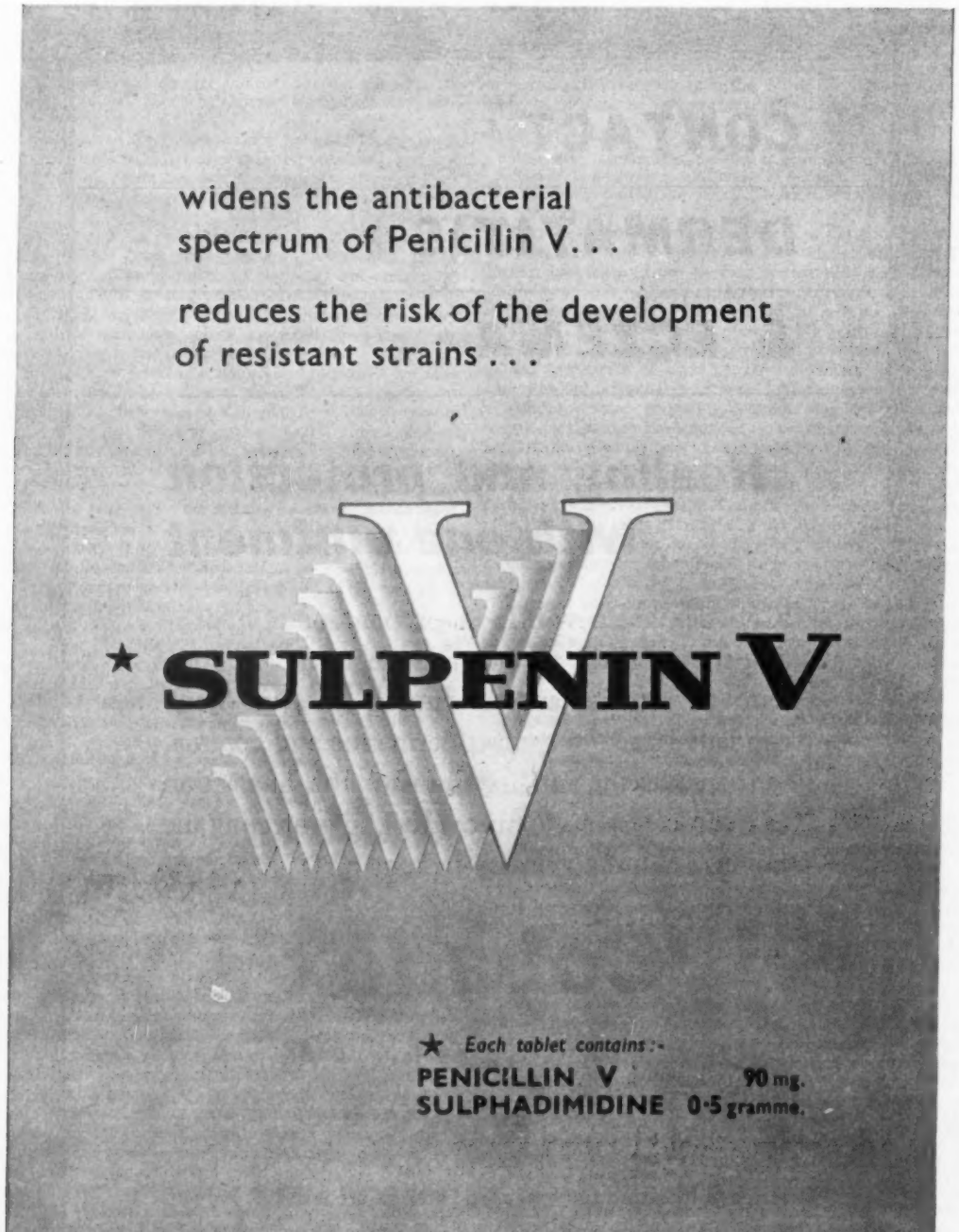
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THE LANCET
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The Twist of the Cord

No surgical emergency is more commonly misdiagnosed than torsion of the spermatic cord: to suggest that 70% of twisted testes are lost because of delay in diagnosis may be a charitable underestimate. Whether such charity is deserved is another matter. The condition is eminently treatable when recognised in time; and the fact that patients with unilateral testicular atrophy do not usually realise that they are the victims of medical error is hardly a source of comfort.

Torsion of the spermatic cord is uncommon (though not nearly so uncommon as hospital records would indicate); and it might be argued that little time can be devoted to it in undergraduate teaching. But too much, not too little, is usually said. It would be preferable to impress on the student simply that any painful swelling in the scrotum, or any scrotal swelling with abdominal pain, should be treated as a case of torsion unless some other cause is definitely established, and to add a word of warning about undescended testes. Torsion conforms to no classical picture, nor are there characteristic features by which it can be excluded. Many textbooks still maintain that the onset is usually sudden; but this is by no means so. In a series of 31 patients, seen between 1943 and 1956 at the Radcliffe Infirmary, Oxford, SMITH [1] found that the symptoms had struck suddenly in only 14; and in 7 the first complaint had been dull abdominal or loin pain. Such referred pain is a common diagnostic pitfall; and it is not confined to cases of incomplete descent. Testicular pain is often felt at a point occupied by the testis in embryonic life—especially in the region of the internal inguinal ring [2]—and inflammation of the tunica vaginalis can simulate intra-abdominal peritonitis. In the Oxford series strangulated inguinal hernia had been diagnosed in 5 cases, appendicitis in 2, and perforated duodenal ulcer in 1. Indeed, only 6 of the 31 cases had been diagnosed correctly before admission; and SMITH adds, in all fairness, that "the misdiagnosis [had been] several times accepted after admission".

The commonest, and in many ways the most calamitous, error is to diagnose acute epididymo-orchitis; and it is therefore not surprising that surgical teachers should concentrate on the differential features of these two conditions. That such differences exist cannot be doubted; but it is debatable whether more harm or good is done by relying on them in everyday practice. Mild trauma sometimes precedes torsion, and it may seem reasonable to postulate a mechanical cause of a mechanical disorder. Yet this is in fact one of the armchair notions that prevent earlier diagnosis. Life is marked by an uninterrupted succession of trivial injuries; and it is almost fatuous to name such pursuits as gardening or playing football as possible predisposing causes. 2 of SMITH's cases were in jockeys; but neither of them had ridden during the twenty-four hours before the onset of symptoms. In a 3-day-old baby who was known to have had torsion at birth "it was difficult to see any possible cause other than fœtal movements in utero". In 8 of his patients torsion started during sleep.[1] Moreover, sudden physical strain, and a rise of pressure in the posterior urethra, has not yet been exonerated as a precipitating cause of acute non-specific epididymo-orchitis. Slightly more valuable, though neither positively nor negatively diagnostic, is a history of previous warning episodes—sometimes only momentary and often amounting to no more than a "niggle" or a "twinge". However trivial these may seem, it is difficult to condone such terms as "cremasteric colic" or "testicular neuralgia"; even true anxiety symptoms are rarely referred to the scrotum. Patients with recurrent subacute torsion form another small but characteristic group. Occasionally the patient's age is of diagnostic help. Epididymo-orchitis is exceedingly rare—and mumps orchitis practically unknown—before puberty; while torsion respects no age. All observers agree that the peak incidence is between 13 and 20 years,[1 3–6]; but middle-aged and elderly cords have been known to twist, and infants are frequent sufferers. In a survey of 30 cases, seen at four Edinburgh hospitals in 1948–54, ROBB [7] records that 9 were between 15 and 20, 8 under 5, and 6 over 20; and SCOTT [3] mentions a 53-year-old patient who had had attacks of testicular pain at about two-yearly intervals since the age of 15. These workers note the absence of urinary symptoms before torsion; but such symptoms are not at all common in the early stages of epididymo-orchitis.

Occasionally torsion can be diagnosed at a glance or by the lightest touch. Far more often it is indistinguishable with complete certainty from epididymo-orchitis; and if the patient is to be treated conservatively nothing less than complete certainty is permissible. Several eponymous physical signs bear witness to the clinical acumen of their originators—and to the difficulties they had themselves experienced. The sign perhaps most widely known—that elevation of the affected testis tends to relieve the pain of epididimytis but to aggravate the pain of torsion [8]—may have statistical validity, but it would be most unwise to base on it alone a negative diagnosis. SMITH [9] suggested that, for easier palpation, the cord should be infiltrated with local anæsthetic: and OGILVIE [10] found diagnostic aspiration of the secondary hydrocele helpful. But infiltration abolishes the patient's subjective response to pressure; and the characteristic bloodstained effusion in the tunica vaginalis may be slow to accumulate. And there is the greatest urgency if the testis is to be saved: "if you let slip time", MILTON observed in a different

1. Smith, K. H. *Brit. J. Surg.* 1958, **45**, 280.
2. Brown, F. P. *Brit. med. J.* 1956, ii, 719.
3. Scott, J. E. S. *Postgrad. med. J.* 1956, **32**, 435.
4. Abeshouse, B. S. *Urol. cut. Rev.* 1936, **40**, 699.
5. O'Conor, V. J. *Surg. Gynec. Obstet.* 1933, **57**, 242.
6. Donovan, R. J. *Ann. Surg.* 1930, **92**, 405.
7. Robb, W. A. T. *J. R. Coll. Surg. Edinb.* 1957, **2**, 71.
8. Prehn, D. T. *J. Urol.* 1934, **32**, 191.
9. Smith, G. I. *Calif. Med.* 1953, **78**, 506.
10. Ogilvie, W. H. *Ann. R. Coll. Surg. Engl.* 1948, **2**, 219.

context, " like a neglected rose it withers on the stalk ".[11]

In a densely populated country it should be possible to send every patient to hospital on the slightest suspicion, thus giving surgeons a chance to operate immediately. Manual untwisting is still recommended by some as a possible alternative [12 13]; but, though the method scores an occasional success, the successful performer is usually the patient rather than the doctor. After several subacute episodes some men acquire a knack in this manœuvre; and the medical amateur will be most unwise to persist in his efforts once the expert has failed. Time is better spent in arranging for the patient's immediate transfer to hospital. For the journey all he needs is a sedative and a suspensory bandage; to apply hot-water bottles—as is done often by patients, and occasionally by doctors—is as irrational as warming the limb threatened by gangrene. If in hospital the diagnosis is confirmed, or if doubt persists, the scrotum must be explored. Conservative treatment has been advocated for infants, on the questionable ground that in them the diagnosis is always late [14]; and some surgeons feel that conservatism is justified in old people Unfortunately, in the elderly torsion is liable to progress to septic necrosis and gangrene. For the patient the operation (which can be performed under local anæsthesia) is trivial. From the surgeon it requires scrupulous asepsis, gentleness, and a thorough knowledge of normal and abnormal scrotal anatomy. The majority of torsions affect abnormal testes; and even normal landmarks may be obscured by swelling and congestion.

The most important anomaly in the ætiology of this disorder is complete investment of the testis and epididymis by a capacious tunica vaginalis [15–17]; or the whole scrotal contents may lie free within the scrotum, resembling the condition described in normal infants by ASTLEY COOPER.[18–20] In G. I. SMITH's series of the 25 cases in which the site of torsion was recorded it was extravaginal in 22; and (contrary to the opinion of earlier workers [21]) there is little doubt that the first two centimetres above the tunica vaginalis is the segment most commonly involved. Rarely the testis rotates around an abnormally long or mobile mesorchium; and multiple twists have been described.[22] Testicular torsion (in both its acute and recurrent subacute forms) may be indistinguishable clinically from torsion of a hydatid of Morgagni. In the latter disorder at operation the greatly enlarged plum-coloured appendage can be a perplexing finding; but the surgeon must not rush into an unnecessary orchidectomy. Also hard to diagnose is the rare case of testicular rupture: and here too excision of the prolapsed tissue and suture of the tunica albuginea (rather than removal of the organ) may be the best course to follow.[1]

11. Milton, J. *Comus*, 1.
12. Burkitt, R. *Brit. med. J.* 1956, ii, 345.
13. Smith, R. E. *Clin. J.* 1934, **63**, 250.
14. Glaser, S., Wallis, H. R. E. *Brit. med. J.* 1954, ii, 88.
15. Muschat, N. *Surg. Gynec. Obstet.* 1932, **54**, 758.
16. Roche, A. E. *Brit. med. J.* 1939, i, 27.
17. Adams, A. W., Slade, N. *ibid.* Jan. 4, 1958, p. 36.
18. Cooper, Sir A. Observations on the Structure and Diseases of the Testis. London, 1830.
19. Cooper, E. R. A. *J. Anat. Lond.* 1929, **64**, 5.
20. Campbell, M. F. *J. Pediat.* 1948, **33**, 323.
21. Ewert, E. E., Hoffmann, H. A. *J. Urol.* 1944, **51**, 551.
22. Underhill, B. *Lancet*, 1955, i, 129.

Earlier workers laid stress on the prevalence of torsion in undescended testes. SCOTT concluded that " approximately 50% of cases of torsion occur in cryptorchids; and, as the undescended testis is found in only about 0–2% of all men, this is a predisposing factor ".[3] Greater awareness of scrotal torsion will almost certainly lead to revision of such estimates.[23 24] The complication may be slightly commoner in incompletely descended testes, but only in proportion to the frequency of incomplete descent; and some of the difference may be due to the fact " that one of the common misdiagnoses is strangulated inguinal hernia, a condition calling for immediate operation which reveals the true state of affairs ".[1] Malignant tumours of the testis account for many intra-abdominal torsions [25]; nor is this association unknown in the fully descended organ.[26 27] Another disputed feature of this condition is its alleged right-sided preponderance.[28] The distribution was approximately equal on the two sides in ABESHOUSE's and in G. I. SMITH's series; and SMITH feels that there is " no good reason why one side should be affected more often than the other ". It may be worth recalling, on the other hand, that congenital herniæ and incompletely descended testes are commoner on the right than on the left side.

When the testis is viable some form of fixation is the obvious procedure of choice.[29] When viability is in doubt it may still be wise to leave the ischæmic organ behind and to counter the threat of infection by conservative means; endocrine function is apparently preserved in some glands which have lost their power of spermatogenesis. Bilateral torsion is not common (5–10% seems a reasonable estimate [30]); but, especially where one organ has already been lost, there is every reason to advise prophylactic fixation of the other.

The British Pharmacopœia

THE publication of a new *British Pharmacopœia* is a matter of considerable moment in the medical world. Even though the practising doctor obtains his information about pharmaceutical preparations from other—and less austere—literature, sooner or later his prescribing habits are affected by the crystallisation of therapeutic opinion which occurs every few years between the covers of the *B.P.* and the *Addendum*. It is true that additions and deletions are so numerous that a *Pharmacopœia* might be regarded as a public declaration of a Commission's fallibility. But the book represents objective opinion at the time of writing; and in these days remarkable developments are possible in the few years between official pronouncements.

The influence of the *British Pharmacopœia* extends far beyond an implicit recommendation of the drugs listed. For well-nigh a hundred years it has been a recognised book of standards. It symbolises much that is of value in the British tradition: its status has been

23. Walton, A. J. *ibid.* 1952, ii, 211.
24. Bailey, H. Emergency Surgery. Bristol, 1953.
25. Guice, E. G. *Ann. Surg.* 1954, **139**, 524.
26. Mohardt, D. T. *Ill. med. J.* 1943, **84**, 389.
27. Babcock, J. W. *J. Amer. med. Ass.* 1916, **66**, 1699.
28. Aird, I. Companion in Surgical Studies. Edinburgh, 1949.
29. Wheeler, J. S., Clark, F. B. *New Engl. J. Med.* 1952, **247**, 973.
30. Deming, C. L., Clark, B. G. *J. Amer. med. Ass.* 1953, **152**, 521.

achieved through the disinterested service of a host of scientific workers who have looked for no reward beyond pride in a job well done. Admittedly, times have changed. The *B.P.* is no longer a catalogue of galenicals contributed by generations of empirical physicians. It is increasingly a compendium of pharmaceutical preparations included only after critical assessment by means of clinical trials; and the monographs and appendices create for the *B.P.* a unique position as a book of reference in laboratories as well as in the dispensary. This continuing revolution has been effected chiefly by the pharmaceutical industry—British and foreign. This point deserves emphasis. The new outlook in therapeutics has been made possible only by the vigorous application of scientific method and commercial enterprise. It is only fair to say also that the attitude of the pharmaceutical industry towards the Pharmacopœia Commission has been characterised by enlightened benevolence. All the leading firms have been quick to recognise the intrinsic worth of the *Pharmacopœia*, and they have encouraged their experts to help the Commission in every way possible. Further, they have regarded the inclusion of their products in the *B.P.* as a coveted token of official recognition of the therapeutic value of these preparations.

In this context, the *B.P.* 1958 [1] may mark the end of an epoch. Among the "principal changes" to which reference is made in the introduction is the following statement regarding the use of colour:

> "Permission has been given in a limited number of monographs on tablets for the addition of a suitable colouring agent to the coating because unfortunately uncoloured tablets have not been made available. Similar provision has been made for some capsules."

The use of colouring matter in official preparations—except where there is a clear pharmaceutical justification—has been consistently forbidden by previous Commissions. The medical practitioner may be unlikely to regard this veto as of much importance: if manufacturers prefer gaudy pharmaceuticals they are only falling into line with the confectionery trade and the motor-car industry. Nevertheless doctors must be increasingly aware that the polychromasia of the chemist's shop has introduced new hazards. The reference to a "principal change" is ominous, for clearly the commissioners were obliged to make a choice between principle and expediency. The manufacturers say in effect:

> "Here is a new drug synthesised and owned by our firm. It has been shown by rigorous clinical trials and by wide experience to be therapeutically valuable. You—the Pharmacopœia Commission—can hardly avoid including it in the next *B.P.* or *Addendum*. Now we, as the sole manufacturers, have decided to release this drug only in the form of a tablet with a coating artificially coloured blue. If therefore you include the drug itself in the *B.P.* you must accept our directions about the colour of the official tablet. If you publish in the *B.P.* a monograph describing the drug itself (a white powder) you will only make yourselves look ridiculous because we shall refuse to supply the preparation in any form other than that of the blue tablet. We know that when we first marketed this drug as a coloured preparation we did not follow the recommendations of the Commission; but we believe that by means of colour we can build up a conditioned reflex in the minds of patients and doctors whereby our tablet is favoured in prescribing for patients suffering from a common disease. This association of ideas is immensely important in the commercial world; so it must be allowed."

Though the permission now given to different manufacturers to market the same *B.P.* preparation in different colours may appear a small matter, it is quite a serious one if it means that the control of standards is no longer firmly in the hands of the commissioners. Someday a manufacturer may tell the Commission that there are so many coloured tablets that he has decided to introduce his new spasmolytic in the form of a crescent-shaped tablet because he has a special interest in the Oriental market. *B.P.* preparations of a new cardiac glycoside might be presented in heart-shaped tablets, and for a new diuretic preparation they might be reniform. These suggestions are by no means fanciful, for a manufacturer could justify his action by the kind of arguments used in favour of allowing colour.

We certainly do not suggest that standards and practices which differ from those of the *B.P.* are necessarily inferior. Further, there can be no quarrel with a manufacturer who deliberately disregards the rulings of the Commission and decides to go his own way. But having done so, he has no claim, we think, to ratification of his decisions by those whose standards are unrelated to commerce. The contribution of creative commercial enterprise to present-day medicine is very great; but its importance would not justify any weakening of the detachment with which the Pharmacopœia Commission have performed their different kind of public service. The printing of the Royal arms on their volume is evidence of their particular responsibilities as well as of their necessary privileges.

Support for the Family

TRADITIONALLY the good family has always looked after its weaker members—the old, the young, and the sick. The burden, even when willingly accepted, has often fallen unevenly; and in this century of small families, an ageing population, and working women, the system has shown signs of strain. Fortunately people have come to recognise that the larger society of the community, as well as the closer society of the family, has some responsibility for all its members; and the benefits of the Welfare State are the community's recognition of this duty. But the proper balance of responsibility between the family and the community is not easily reached. Over-protection can be a threat to the integrity and independence of the family. Indifference and lack of support may in the long run discourage even the most devoted relatives.

Some of the benefits which the State offers are dependent on a medical certificate; and because of this proviso and his knowledge of family circumstances the family doctor is well placed to judge how the scheme is working. Dr. ASHWORTH in his survey of certification in a Manchester practice (p. 732) gives on the whole a good report, but he admits that a few of his patients' claims

1. British Pharmacopœia, 1958. London: Pharmaceutical Press for the General Medical Council. Pp. 1012. £3 3s.

for sickness benefit were prolonged on social rather than medical grounds. For instance return to work was sometimes delayed not by the worker's own illness but by the illness of other members of the family. Concessions to domestic difficulties of this kind can be economical as well as humane; for the alternative is often a hospital bed, a home help, or a home nurse, any of which will probably cost the community more than an extra week or two of sickness benefit. But if the need is real—and Dr. ASHWORTH's examples suggest that it is—would it not be better to admit its existence and allow the doctor to authorise an official benefit to meet a family emergency? If, on a medical certificate, a healthy worker could claim an "emergency" benefit for a limited period of two or three weeks, to cope with a family crisis, the doctor need no longer uneasily feel that he is interpreting the rules of National Insurance rather freely. The main difficulty, perhaps, would be the attitude of the employer, and of fellow workers, to this form of absenteeism. Though in times of full employment many employers may allow their workers leave of absence under domestic duress, only a few of them, such as the London County Council, recognise it explicitly. The majority view may be that industry cannot afford to encourage workers to leave their productive work; and admittedly the cost to the community through the loss of working time might well be heavier than the sums paid in actual benefit. Even so, there might be a clear economic advantage through relief to the hospital and social services. In the specially acute emergencies where a household is temporarily disrupted by the illness of the mother, an "emergency" benefit would make it easier for a husband, or a daughter, to take over the mother's duties temporarily; and, in days when help is hard to find outside the family circle, it might in fact be more useful than a benefit for the housewife in her own right, such as she has in Sweden.

Besides emergencies, there are lasting disasters when some member of the family must give up work entirely so as to enable an invalid to remain at home. Severely disabled war pensioners can already claim an attendant's allowance, but the middle-aged daughter who gives up her job to look after her mother who has had a stroke is forced to seek National Assistance. In theory there is of course no reason why she should not; but in practice an official benefit would be a helpful recognition of her work and a token of the community's support and backing. Indeed from time to time it has been suggested that a modest allowance should be offered to relatives who undertake the care of bedridden old people, and this proposal has lately been put forward again by Mr. PETER TOWNSEND [1] as a result of his survey of old age in Bethnal Green. To say that a benefit of this kind would destroy the solidarity of the family is one way of looking at it. Another is that it would be a supplement which the community would offer the family to enable them to keep the old person at home. An allowance of this kind, backed by the assurance of a regular visit from a home nurse or a home help, and regular breaks when the old person could stay in a hospital (as in the scheme described by DE LARGY [2]), might go a long way towards solving the problem of our old people. Admittedly the frailty of old age is not the only cause of a possible breadwinner being tied to an impoverished home: other equally deserving people, such as widows or deserted wives with young children, have to turn to the National Assistance Board for help. But old people have the administrative advantage of forming a large and fairly compact group. Undoubtedly also the provision of hostels and hospitals stimulates the demand for residential accommodation, and any alternative method of looking after our old people which would break this expensive and often second-best circle is worth considering.

Another family question, more complex and more prickly, is also set by one of Dr. ASHWORTH's cases. In one family the father prolonged his sickleave to look after two children who were ill, because the mother would have lost her job had she stayed at home. This arrangement may well have been the best to meet the emergency of illness. But in this family in normal times the two parents were apparently in full-time employment. No-one has anything but sympathy and respect for the singlehanded parent who is forced to earn a living for a family and run the home at the same time; but where there are two parents—at any rate while the children are young—a stable family background is usually best provided by a whole-time mother. There are few hard facts about the extent of "mother employment". Custom probably varies from locality to locality, and circumstances from family to family. An able-bodied grandmother, for instance, may be acting as a competent and loving locum tenens. But the uneasy feelings of many who work among children, especially in industrial areas, were lately expressed by the BISHOP of WOOLWICH in his Mothering Day sermon.[3] He pointed out that half the women in industry today are married. So large a proportion probably includes too many mothers, and he asked "How can there be a home life when children come home from school to an empty house . . . when mother is too tired at the end of the day for either children or husband?" His plea has been reinforced by a Lancashire vicar [4] who estimates that 5% of the children in one of his church schools return to homes where no parent and often no adult awaits them. In our own columns [5] a psychologist has expressed his reluctant acquiescence in the provision of day nurseries because the mothers need the money and the local industries the labour. To offer a mother money to stay at home to look after her own children may seem extravagant, and probably only a fairly substantial subsidy would be effective. The French system of offering mothers a *salaire unique* related to the minimum wage and the number of children is admittedly expensive; but, if we count the cost in insecure and unsupervised children, our own laissez-faire system may not prove cheap.

1. Townsend, P. Family Life of Old People. London: Routledge and Kegan Paul. 1957. Pp. 284. 30s.

2. De Largy, J. *Lancet*, 1957, i, 418.
3. See *Times*, March 17, 1958.
4. Tucker Harvey, V. L. *ibid.* March 24, 1958
5. Jones, H. *Lancet*, 1957, ii, 739.

Annotations

POSTOPERATIVE METABOLIC CHANGES

THE metabolic effects of injury have not yet been fully defined. Starvation is widely believed to play only a small part in bringing about the increased urinary excretion of nitrogen and potassium and the reduced output of sodium; injury is supposed to be the most important single factor in producing these changes. But Dr. Abbott and his colleagues, whose report we publish this week, believe that operative trauma and anæsthesia are only minor factors and that dietary restriction, complications, previous nutritional state, and age are the major factors.

They describe observations on the effects of cholecystectomy in 11 women and 2 men who were placed on one of three types of dietary regimen for three days before and three days after operation; the two periods of observation were divided by an intermission of three to four days during which an ordinary full diet was consumed.

When 5% glucose solution alone was given for three days operation had little effect on the excretory pattern of sodium, potassium, or nitrogen. When sodium and potassium were administered in addition to glucose the postoperative variations were similar to those who received glucose only, except in one patient whose wound became infected. In a third group of patients 5% protein hydrolysate and 10% fructose were added to the glucose, sodium, and potassium. Although these patients produced larger volumes of urine than those in the other two groups their losses of sodium, potassium, and nitrogen and of body-weight were smaller. Nevertheless the protein and carbohydrate supplied were evidently not wholly adequate, because even in the control period there was a nitrogen deficit and some weight-loss.

That so little metabolic disturbance follows uncomplicated cholecystectomy is not very surprising and raises the question whether this operation causes sufficient damage to provide an adequate stimulus—adequate, that is to say, for present methods of measurement and detection of the items of postoperative metabolic variation. This doubt is strengthened by the distinct effect of a pyrexial complication in one patient of the series, and by the authors' statement that a larger metabolic disturbance is associated with severe blood-loss, necrosis, or injection. There is abundant evidence that after injury urinary nitrogen excretion is closely related to the previous state of protein nutrition and the plane of protein metabolism, and that in malnourished patients nitrogen excretion may increase little, if at all, even after very severe operations. In well-nourished patients, however, provided the surgical injury is sufficiently severe nitrogen output usually increases notably. Since in simple starvation the urinary nitrogen output usually declines and seldom increases, the large increase of nitrogen output which follows many major operations can hardly be attributed to inadequate diet.

The report by Abbott et al. raises again the important question of what part intravenous therapy should play in postoperative treatment. The metabolic disturbances recorded here do not appear to demand intravenous therapy, which is expensive and not entirely free of the risk of complications, such as chemical thrombophlebitis. The argument for such treatment would be stronger if there were larger differences between control and postoperative periods, and between the group who received glucose, potassium, sodium, fructose, and protein hydrolysate and the patients who received only glucose. Until much more is known about the metabolism and excretion of adrenal cortical hormones and their end-products little is to be gained by discussing the apparent conflict between the observations of Abbott et al. and of Moore et al.[1] and Steenburg et al.[2] on the relation of nitrogen balance to urinary hydroxycorticoid excretion. The postoperative metabolic disturbances are likely to be due, not solely to "permissive" adrenal-steroid activity or to local tissue damage, but rather to a combination of both processes; and local damage is likely to prove the primary stimulus.

LABORATORY SERVICES IN SCOTLAND

LABORATORY services in Scotland have developed somewhat differently from those in England. Clinical pathology as practised in England is a recent development in Scotland, where in the past laboratory investigations on patients were carried out mainly by university departments of pathology (which really meant morbid anatomy), bacteriology, and biochemistry; and in many hospitals hæmatology is still a province of medicine rather than of pathology. Even now, a very large amount of the clinical-pathological work in Scotland is done by the university departments of pathology, and probably a larger proportion is done "postally" than in England; this is largely inevitable because of the sparseness of the population in many areas; but possibly there is still too much centralisation in the university laboratories. Another difference is that there is no separate Public Health Laboratory Service, and public-health-laboratory work is carried out by the laboratories that are also responsible for the hospital laboratory work.

A committee was set up by the Scottish Health Services Council in 1956 to consider the future of the laboratory service. In its report [3] this committee recommends that regional plans should be developed for the hospital pathological work, so that university departments should do only such routine work as is necessary for teaching and research. As regards administration of the laboratory services the committee, while admitting that a case could be made out for a regional pathological service centrally administered by the regional boards, felt that the existing service under the boards of management should be continued, but with the important difference that there should be more centralised planning of laboratory services by the regional boards with the advice of a strong pathological advisory committee, which would include members of the regional board, general practitioners, medical officers of health, and other consultants, in addition to pathologists.

The committee insists that boards of management must be prepared to take account of matters beyond the local interest of their particular hospitals and proposes that the laboratories under more than one board of management be grouped to provide a more comprehensive service. Although the expenditure on laboratories has increased proportionally nearly twice as much as expenditure in the hospitals generally, much still remains to be done; and the committee proposes that special revenue and capital allocations should be made to the regional boards for laboratory purposes and that regional boards should not have the power to divert these allocations to other purposes.

Much of the report is of interest to hospitals in England and Wales. In particular a wider grouping of hospitals

1. Moore, F. D., Steenburg, R. W., Ball, M. R., Wilson, G. M., Myrden, J. A. *Ann. Surg.* 1955, **141**, 145.
2. Steenburg, R. W., Lennihan, R., Moore, F. D. *ibid.* 1956, **143**, 180.
3. Department of Health for Scotland: Scottish Health Services Council. The Organisation of Laboratory Services. H.M. Stationery Office. 1958. 1s.

than by hospital management committee areas to provide comprehensive specialist pathology services is very desirable: many hospital management committees have tended to try to build up a self-contained laboratory service, even though special facilities can more economically and advantageously be provided by grouping with hospitals in neighbouring groups. The direct allocation of funds specifically for laboratory development is also worth considering.

The committee maintains that there is no case for a separate public-health service, as in England, and suggests that the future of the two existing public-health laboratories should be considered with a view to their full integration in the main laboratory service. Many may feel that in England the separation of the Public Health Laboratory Service from the hospital laboratory service is in places too wide, and that much might be gained by unifying the service at the periphery.

THE HAMMAN-RICH SYNDROME

UNDER the heading "acute diffuse fibrosis of the lungs" Hamman and Rich [1] described in 1944 a peculiar disease of the lungs, of which altogether 63 cases have now been reported.[2] Since most cases have a subchronic or chronic course the adjective "acute" has been omitted in later reports, and the disorder is now referred to as the "Hamman-Rich syndrome" or "diffuse progressive interstitial fibrosis of the lungs".

The disease affects adults of all ages; only 2 cases in children have been reported.[3 4] The youngest patient ($2^1/_2$ years) was that of Baar and Braid,[4] the oldest (72 years) that of Peabody et al.[5] The onset is usually insidious. The presenting symptom is progressive shortness of breath, which becomes associated with cyanosis. Cough may be present from the onset; profuse mucopurulent, occasionally bloodstained, sputum is a comparatively late symptom. Finger-clubbing was noted in about a third of all cases. Cor pulmonale and right-sided heart-failure develop in the late stages. Radiographic examination shows in only about a third of all cases the appearance of diffuse reticular striation of lung-fields; and occasionally this is associated with minute cystic spaces or fine honeycombing. In the other two-thirds of cases there may be slight changes, such as mottled opacities in the hilar regions; or the appearance of congestion or of pneumonic consolidation may be found. Histological examination shows diffuse changes in both lungs, although in different areas the lesions may be of different ages. Everywhere the interstitial tissue, particularly the interalveolar septa, is broadened either by infiltration with monocytes, lymphocytes, and plasma cells or by fibroblastic proliferation with or without formation of collagen fibres. The alveoli are usually lined by cuboid epithelium; they are either empty or contain a moderate number of alveolar macrophages. Hyaline membranes may be present, but are seldom abundant. Capillaries in the interalveolar septa may be obliterated.[2]

Luchsinger et al.[6] studied "cardiopulmonary" function in the Hamman-Rich syndrome. They found restriction of the pulmonary capillary bed with resulting insufficient diffusion of oxygen. The thickened interalveolar septa and the destruction of capillaries lead to reduced alveolar-capillary "contact-time" and so to what Austrian et al.[7] named "alveolar-capillary block".

In differential diagnosis Baar and Braid [4] suggest that the following conditions be considered: (1) chronic indurative pneumonia; (2) bilateral bronchiectasis; (3) atypical pneumonia; and (4) the so-called "rheumatic pneumonia". Such disorders as pulmonary hæmosiderosis, retrograde lymphatic spread of thymic carcinoma,[8] or syphilitic pneumonia are easily differentiated on clinical and morbid-anatomical evidence. In several cases diagnosis was decided by means of lung biopsy. This procedure seems to be justified, because some workers reported remissions or possibly arrest of the disease by treatment with cortical steroids or corticotrophin together with antibiotics.[2 9 10] Others,[4] however, have observed no benefit with this therapy.

The ætiology of the Hamman-Rich syndrome is unknown. It may be significant that some patients have signs of hypersensitivity, and that a few show, in addition to diffuse interstitial fibrosis of the lungs, changes characteristic of "collagen disease", such as "wire looping" of renal glomeruli, L.E. cells, and periarteritis nodosa. Possibly allergy is at the root of the disorder. There are some indications that, although the Hamman-Rich syndrome is a clinicopathological entity, it does not always arise from the same cause. Thus the case of Callahan et al.[11] was probably a pneumocystis pneumonia while the case of an infant described by Donohue,[12] which was probably an example of the Hamman-Rich syndrome in an early stage, presented the histological changes of interstitial plasma-cell pneumonia without pneumocystis.

THE RUSSIAN VACCINE

ANSWERING questions about the Russian vaccine which has been used in the treatment of multiple sclerosis, the Minister of Health said in the House of Commons on Feb. 24 that the evidence at present available was not sufficient to enable an opinion to be given on the efficiency or safety of this vaccine. He added, however, that he was prepared to advise the release by Customs and Excise of small quantities imported for individual treatment on the advice of the patient's doctor. His department would continue to gather all the information they could.

There is indeed little published evidence at present. The story began in 1946 with the claim by Margoulis et al.[13] that they had isolated a virus which was neutralised by the sera of patients with multiple sclerosis; and subsequently Margoulis and Choubladze evolved a vaccine for the treatment of multiple sclerosis. It was a suspension of brain tissue of white rats or mice infected experimentally with a virus of acute encephalomyelitis of man. The virus was inactivated by formalin. Last year Dick and his colleagues [14] in Belfast examined the properties of the virus concerned—the SV strain of E.H.A. virus. Their results suggested that it was rabies virus. They were unable to demonstrate any specific neutralisation of this strain with sera from patients with multiple sclerosis;

1. Hamman, L., Rich, A. R. *Bull. Johns Hopk. Hosp.* 1944, **74**, 177.
2. Rubin, E. H., Lubliner, R. *Medicine*, 1957, **36**, 397.
3. Bradley, C. A. *J. Pediat.* 1956, **48**, 442.
4. Baar, H. S., Braid, F. *Arch. Dis. Childh.* 1957, **32**, 199.
5. Peabody, J. W., Peabody, J. W., Jr., Hayes, E. W., Hayes, E. W., Jr. *Dis. Chest*, 1950, **18**, 330.
6. Luchsinger, P. C., Moser, K. M., Bühlmann, A., Rossier, P. H. *Amer. Heart J.* 1957, **54**, 106.
7. Austrian, R., McClement, J. H., Renzetti, A. D., Jr., Donald, K. W., Riley, R. L., Cournand, A. *Amer. J. Med.* 1951, **11**, 667.
8. Baar, H. S. *Öst. Z. Kinderheilk.* 1954, **10**, 2.
9. Pinney, C. T., Harris H. W. *Amer. J. Med.* 1956, **20**, 308.
10. Harris, M. S., Preuss, F. S., Goldman, A., Friedman, N. *Amer. Rev. Tuberc.* 1957, **76**, 123.
11. Callahan, W. P., Jr., Sutherland, J. C., Fulton, J. K., Kline, J. R. *Arch. intern. Med.* 1952, **90**, 468.
12. Donohue, W. L. *Lab. Invest.* 1956, **5**, 97.
13. *J. Neurol. Psychiat.* 1946, **9**, 63.
14. Dick, G. W. A., McKeown, F., Wilson, D. C. *Brit. med. J.* 1958, **i**, 7.

and they pointed out that the reported improvement of 30% of patients who had had the vaccine [15] was no more than might have been expected from the spontaneous remission of fresh lesions in untreated patients.

If the vaccine does in fact contain inactivated rabies virus, the Minister will be very reluctant to allow larger quantities to enter the country until the matter of its safety has been more closely examined. The efficiency of the inactivation process must be assessed; and the risks involved in injecting brain tissue must also be weighed. On the other hand, the interest which the vaccine has aroused springs largely from the sense of hopelessness which now surrounds the treatment of multiple sclerosis; and quite apart from the risk of concluding prematurely that the vaccine has nothing to offer, it is important to make plain to patients and their relatives in this country that every new idea is being carefully considered, even though the prospect is discouraging. To make the course of justice more apparent in the case of this much-publicised vaccine the Minister might authorise the importation of a quantity for safety testing. If the tests are satisfactory, clinical trials might then be arranged.

MASSIVE VENOUS OCCLUSION

THE usual forms of thrombophlebitis are easily recognised, but the dramatic and often fatal blue phlebitis,[16] phlegmasia cerulea dolens, or massive venous occlusion,[17] is often confused with acute arterial obstruction. The pathology of this form of phlebitis is not well understood; some cases are described in which the disease affected healthy people going about their usual routine, although in most instances it has complicated some other lesion. The extensive venous thrombosis in this condition may plug the outflow by the major veins draining the leg, or by extending peripherally to the smallest radicles obstruct capillary blood-flow; a large volume of blood is thus dammed back and lost to the circulation; the oligæmia causes death in some 25% of patients, and gangrene develops in 50%.[18] Edwards [19] has confirmed that the pressure in patent peripheral veins is extremely high; whether this high venous pressure is due partly to venospasm or whether there is associated arteriospasm is still disputed.

Massive venous occlusion can be readily diagnosed when episodic attacks of thrombophlebitis have culminated in painful œdema of the limb, which is dusky. The diagnosis is less easy when the disorder develops abruptly in a previously normal limb; but the severe pain, massive œdema, and turgid veins contrast sharply with the findings in arterial obstruction. Treatment is by no means satisfactory. Undoubtedly oligæmic shock must be rapidly corrected by transfusion, but the measures to be directed to the limb are less certain. Those who believe that spasm is a factor in the persistence of the condition have advocated paravertebral block or spinal anæsthesia. Edwards [19] was impressed by the improvement following spinal anæsthesia in 3 of his patients, although his continuous recording of venous pressure in the affected limb does not show convincing evidence of release of venospasm; whereas removal of an 8 in. clot from the common femoral vein was followed by a considerable fall of pressure. Thrombectomy has been carried out by others [20 21] and seems to be well worth while when it is feasible. Veal [17] advocated a regime of passive exercise in the acute phase, with the purpose of pumping blood out of the limb, but this resulted in pulmonary embolism in one of Edwards' [19] patients.

The value of anticoagulants is also disputed. At the onset of the condition petechial hæmorrhages due to capillary hypertension may be present in the affected skin, and to increase clotting-time seems likely to worsen this bleeding tendency. On the other hand, when thrombectomy has been performed or collateral channels have opened up, anticoagulant therapy may be desirable to reduce the liability to further intravascular clotting. Even so, when by usual standards adequate anticoagulant therapy has been given, massive venous thrombosis has developed.[19 22]

Th[illegible]ch so little is known about the pathology of this disorder, and its treatment is far from satisfactory, early diagnosis can save life and minimise postphlebitic symptoms.

SIR GORDON GORDON-TAYLOR

IN 1903 the University of London instituted the B.SC. degree in anatomy. The only candidates were two young men, Gordon Gordon-Taylor and Victor Bonney. Being busy they decided to work through the night three times a week, sustaining themselves through the long hours by means of coffee essence heated over a Bunsen burner. Both achieved first-class honours. This story is told in the *British Journal of Surgery* for April, 1949, an issue dedicated to Sir Gordon; and last month, in honour of his 80th birthday, that journal once more honoured him by publishing a special Gordon-Taylor birthday number. An introduction by Sir Cecil Wakeley, giving a brief account of his work, is followed by twenty-five articles on surgical topics by his associates and pupils. The frontispiece is a reproduction of a portrait of Sir Gordon by Miss Anna Zinkeisen, which was presented to him at the Middlesex Hospital on March 27.

The singleness of mind shown in his early anatomical studies has remained with him; and he has continued to work, write, and lecture. Sir Cecil refers to his article on surgery of the innominate artery which dealt with work in progress when he was 72. Other topics on which he has written much and with great authority include hindquarter amputation, carcinoma of the œsophagus, and war wounds of the abdomen—he was consulting surgeon to the Fourth Army in the first world war and consultant to the Royal Navy in the second. He has been a fellow of the Royal College of Surgeons for fifty-one years; he has been a vice-president, and has been vice-dean of the Institute of Basic Medical Sciences since its formation. Surgery has been his life, though he was a classical scholar at Aberdeen before he began medicine, and he retains his love of Horace and is out of sympathy with some more modern, and perhaps more transient, entertainments. He has done much to encourage young surgeons; and these and many others will join Sir Cecil Wakeley in his expression of esteem and good wishes to " the doyen of British surgeons ".

Dr. CHARLES HARRIS has been elected vice-chancellor of the University of London for 1958-59.

15. Choubladze, A., Gaidamovitch, S. *G. Mal. infest.* 1956, fasc. II, 173.
16. Gregoire, R. *Pr. méd.* 1938, **46**, 1313.
17. Veal, J. R., Dugan, T. J., Jamison, W. L., Bauersfield, R. S. *Surgery*, 1951, **29**, 355.
18. Moser, M., Babin, S. M., Cotts, G. W., Prandone, A. G. *Ann. intern. Med.* 1954, **40**, 361.
19. Edwards, W. S. *Surgery*, 1958, **43**, 153.
20. DeBakey, M., Ochsner, A. *ibid.* 1949, **26**, 16.
21. Ellis, J. T., Windham, S. W. *Ann. Surg.* 1952, **135**, 262.
22. Catchpole, B. N. *Lancet*, 1957, i, 343.

Special Articles

ABSENCE FROM WORK ON A MEDICAL CERTIFICATE

The Cost to Sickness Funds as seen from a General Practice

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THOUGH I regard it as my duty to see that my patient has all the treatment he needs, I also feel some responsibility for seeing that he returns to work as soon as possible and does not draw unjustly on the insurance funds to which we all contribute. The family doctor is well placed to assess the true extent of unnecessary absence from work ; and, as it is often said that this abuse of the welfare service is widely practised, I decided to analyse the information offered by my practice for the year May, 1955 to May, 1956.

Facts and Figures

The practice has 3300 patients and is part of the Darbishire House Health Centre, established by the University of Manchester as an experimental teaching health centre. The age and sex distribution of patients is similar to that in the country as a whole. The average number of items of service per year given to each patient was 4.

Because I practise in a health centre and in almost ideal conditions, my sickness certification is probably stricter than that of some practitioners, though I still have the usual types of excessively demanding patients.

Unjustified Claims

In my practice, as in any other, there are the obvious malingerers, and in this investigation I counted 10. I refused sick notes to all these patients.

Next came a group of 44 women and 54 men to whom I did issue sick notes although I felt they were extending their absenteeism beyond the time strictly necessary on medical grounds. These women made 53 claims and lost 634 days' work unnecessarily, for which they drew £176 in benefit; the men made 61 claims and lost 640 days for which they drew £234. Of the 44 women 18 were in the fifty-one to sixty-five age-group.

These women are an independent group. They are mostly going out to work to earn money to buy the extras in life, and they seem to change their jobs often. They soon seem to disagree with their employer or frankly have long periods resting, which go beyond what I consider reasonable. Now, if a woman complains of feeling tired, I will always issue her with a sick certificate for a week or two ; but if, after that time, she still shows no symptoms or signs of disease, then I regard her as probably unjustified in prolonging her claim.

Among the men the age-distribution was fairly even. Again, these men all had bad absence records.

Justified Claims

In the same period 114 women and 209 men in my view claimed benefit honestly and did not absent themselves from work unjustly on medical grounds.

These people had periods of sickness which were likely to be of limited duration and the list does not include those thought to have some disability which will permanently interfere with their return to work. The women made 135 claims, and lost 3143 days, for which they drew £863 in benefit ; the men made 270 claims, lost 6561 days, and drew £2505.

TABLE I

—	No. of patients	Women			Men			
		No. of claims	Days lost	Cost (£)	No. of patients	No. of claims	Days lost	Cost (£)
Unjust claims	44	53	634	176	54	61	640	234
Just claims	114	135	3143	863	209	270	6561	2505
Chronic unemployable sick	15	15	4368	1265	17	17	5544	2450
Deaths ..	1	1	246	82	3	3	618	303
Total ..	174	204	8391	2386	283	351	13,363	5492

The Chronic Sick.

This is a group of 15 women and 17 men who, as far as can be seen, are not likely to resume work again. The group is not static, because from time to time patients do return to work, even after years away from it, but the list does not vary much. The women lost 4368 days and drew £1265 in benefit; the men lost 5544 days and drew £2450 in benefit.

Deaths

During the year under review, 1 woman and 3 men died, and they had drawn some sickness benefit.

The Composite Picture

If we set these figures against the background of my whole practice we get a true appreciation of their significance. In all, 457 men and women made 555 claims and drew £7878 in benefit. Of these, 114 women made 135 just claims and drew £863, and 209 men made 270 just claims and drew £2505, in short-term claims of limited duration (table I). The justified sickness claims for men and women came to £3368. About half the sickness claims are for limited periods, and half the money paid out in sick benefit goes to a very small group of chronic unemployable sick patients.

In my view 98 patients made 114 unjust claims which cost £410. Thus, out of every five people who made a claim, one made a claim which was unnecessary or unduly prolonged. Of 21,754 days lost, 1274 were lost unnecessarily (table II).

TABLE II

Total no. of patients claiming benefit ..	457	No. of patients making unjustified claims ..	98
Total no. of claims made	555	No. of unjust claims made ..	114
Total days lost	21,754	No. of unnecessary days lost	1274
Total cost in benefit drawn	£7878	Benefit drawn unjustly ..	£410

These are the tables which a businessman might draw up in introducing an insurance scheme into his own works. But they take little notice of the social and domestic conditions of the patients. After all, it may well be that some of these patients, especially the women, have home commitments which necessitate their absence from work, and it may even pay the community to allow them temporarily to be away from work and to pay them insurance while they are off work.

Social and domestic circumstances sometimes provide extenuating circumstances which allow me to accept claims even though there are insufficient medical causes. These domestic factors may not be sufficient to warrant the patient going to the National Assistance Board and there is often an interweaving of the functions of the doctor and the National Assistance officer.

For example, a man stays off work to look after two sick children during Whitweek. The wife says that if she stays off work she will be dismissed. Obviously it is in the interests of all

that I should cover this man with a sickness certificate. It is the most expeditious way of dealing with the situation. Again, an epileptic gets drunk on a Saturday night. He wets the bed in his lodgings and gets expelled from the house as a result. He gets aggressive and will not go to work until he finds fresh accommodation, and he wants to fight his employer anyway. What else can I do but accede to his request for a sickness certificate?

I therefore looked at these claims again, this time with the eye of a humane family doctor to see how many cases had mitigating circumstances. Apart from the chronic sick and the dying, I estimated that out of 158 women, 14 had periods of sick-leave justified on social or domestic grounds. Similarly, 11 men had mitigating circumstances. The amount of benefit these patients had claimed was £144.

Discussion

Whenever I have discussed unjustified absenteeism with my colleagues, I have met with reticence. Many pretend that it does not exist, since to admit it implies that certificates which the practitioner issues are not accurate. Some ask me "Who is to say that a patient is fit if he himself says he is unfit?"

Patients who say they are not well enough to work and yet the doctor feels they are, usually fall into the following group:

Those who are blatantly trying to draw sick-pay under false pretences.

Those who insist they are not well enough for work and yet are working at home for friends or relations.

Those who are completing their fortnight on the sick-list so that they can claim their three waiting days.

Those who are changing their jobs.

Those who are extending a holiday—e.g., Whitsuntide or Easter.

Those with very mild symptoms.

This last group cause the greatest doubts in my mind, but knowing my patients, and often seeing them in the street, or cinema, or public house, I can form a shrewd assessment of the strength of their claims.

Extenuating factors operate more often in the women's claims, since women have so many responsibilities in the home to their children or to invalids. Indeed, after reviewing the social background of some of the women claimants, one appreciates more than ever the tremendous load which some of them carry. The wonder is that more do not have to give up their work. But the Government have repeatedly made it clear that the general practitioner is responsible for deciding whether or not a patient is fit for work, and I, for my part, have no difficulty in accepting the role of arbiter in these cases.

About 1 in 5 claimants make claims which are unjustified; but in money they draw only £410 between them. As the whole sickness claims over the year amount to £7878 we may conclude that only about 5% of the money paid in benefits is unjustly drawn. When account is taken of social circumstances this figure may be reduced to about 3%. This low percentage is largely due to the very great drain on the sickness funds made by the chronic unemployable patients.

Until I began this investigation I was not aware how big a drain these patients represent. Numbering only 32 (15 women and 17 men), those in my practice draw almost £3700 in a year, or as much as all the short-term absentees put together.

These people have to come to terms with their diseases. Their happiness in life depends on how they do this, but many men fight on in a battle which gradually wears them down. They are often loth to surrender their jobs. Sometimes it is possible to get a man to take over the household duties whilst the wife becomes the breadwinner, but most men regard this as an affront to their dignity. Women seem to settle down more easily when once they have realised the chronicity of their complaint.

Doctors themselves become apathetic in their treatment. It is hard to generate enthusiasm in dealing with a patient who has attended regularly for years, and one colleague has suggested that any patient who is on the sick-list for more than a year should change his doctor. Certainly the doctor needs to ask himself whether everything possible is being done for his chronic sick patients, not only in treatment but in the equally important realm of human relationships and social work.

The disablement resettlement officer has a part to play in trying to place these patients in work, but a closer link needs forging between this officer and the general practitioner. The chronic-sick patient often becomes sullen and suspicious, believing that people think he is malingering. But hope for the future lies rather in preventing patients from reaching this condition rather than in trying to rehabilitate them when they have got there. Considering the cost of these patients in sickness benefit, the community would be justified in spending large sums if necessary in preventing incapacity.

In these days of full employment we are employing people who once would not have been considered on the labour market and we must expect a higher sickness-rate than hitherto. In global figures, in 1954-55 about £840 million was paid in sickness benefit. My findings suggest that 3%, or £2½ million, was claimed unjustly. This does not seem to warrant any radical change in our certification procedure. On the contrary, it demonstrates how small a proportion of working people draw benefit wrongfully, and how well the people in this country play their part in the new social order.

DOCTORS' PENSIONS

NEARLY every doctor in the National Health Service pays superannuation contributions. After 10 years' service, if he is over 60, he becomes eligible for a pension; and with the approach of the tenth anniversary of the start of the N.H.S., many of the more senior doctors will wonder where they stand. The scheme is governed by regulations [1]; two booklets explain the regulations concisely—one as they affect family doctors [2] and the other, more tersely, as they affect all N.H.S. employees.[3]

The conditions on which a pension is paid are the same for specialists and family doctors, though the method of calculation may be different. A pension and a lump sum (the retiring allowance, which has nothing to do with the compensation paid on retirement for loss of the sale of a practice) are payable after 10 or more years' service to a doctor aged 60—at an earlier age only if he is permanently incapacitated. The normal "pensionable age" (i.e., the age at which contributions cease and service is no longer reckonable in calculating benefit) is 65; a family doctor aged 60–64 may apply to the Minister to have his pensionable age extended to any up to 70. (The fact that the doctor has reached pensionable age does not mean that he can no longer practise.) Other benefits provided under the scheme include an injury allowance (for those permanently incapacitated by injury sustained or illness contracted in the course of duty), a short-service

1. National Health Service (Superannuation) Regulations, 1955. S.I. 1955, no. 1084. H.M. Stationery Office. 3s.
2. Barry, H. Superannuation for the General Medical Practitioner. London: Heinemann Medical Books. 1955. Pp. 20. 2s. 6d.
3. National Health Service Superannuation Scheme (England and Wales): an Explanation. H.M. Stationery Office. 1956. Pp. 24. 1s.

gratuity (for those with 5–10 years' service retiring through incapacity), a death gratuity, and a widow's pension.

The amount of benefit depends on length of service and amount of pay. For a general practitioner the annual pension on retirement is $1^1/_2$% of the total "superannuable remuneration" (see below) during the last 45 years of service, or the whole period of service if this is less than 45 years. If he retires before 65 through incapacity, his pension is $1^1/_2$% of his remuneration over not less than 20 years (unless he would have had less than 20 years' service at "pensionable age"). The lump sum is $1^1/_2$% of the total superannuable remuneration for married men and $4^1/_2$% for others; if a man's wife has died or been judicially separated from him, the figure is $1^1/_2$% for each year of service before the wife's death or separation and $4^1/_2$% for each year after. (The difference is because of the widow's pension liability.) If a practitioner has completed 10 years of service, his widow is entitled to a pension, which is in general a third of the pension her husband might have expected; but if she is entitled in her own right to a pension in the same scheme, she is ineligible for a widow's pension (unless she is a practitioner, when she draws both pensions). A death gratuity is usually a year's remuneration or $1^1/_2$% of the total remuneration; but benefits already paid are deducted from it.

Full-time specialists (consultants and S.H.M.O.s), like other salaried staff, are entitled to a pension of $^1/_{80}$ ($1^1/_4$%) of their "average remuneration" (i.e., the average annual remuneration during the last three years of service) for each year of contributing service, to a maximum of $^{45}/_{80}$. The minimum pension for retirement through incapacity is usually $^{20}/_{80}$ of "average remuneration". The lump sum is $^3/_{80}$ of the "average remuneration" per year of service (up to 45), or $^1/_{80}$ for married men. The death gratuity, widow's pension, and injury allowance are calculated on corresponding lines. A part-time specialist has his benefits calculated in the same way as a practitioner's, unless he spends at least nine notional half-days a week as a specialist and has asked the Minister to direct that his benefits be calculated by the other method.

For full-time specialists, "superannuable remuneration" means salary; for practitioners it means all payments by the executive council, less a deduction of the salary paid to any assistants, and of a sum representing practice expenses—50% of payments for mileage and pharmaceutical services, and 30% of most other payments. In the case of a partnership, the remuneration is regarded as being divided equally among the partners unless they have elected otherwise.

One or two examples follow.

An unmarried family doctor who has served 10 years and in that time been paid £20,000 (£14,000 after deduction of practice expenses) will be entitled to a pension ($1^1/_2$%) of £210 p.a. and a lump sum of £630.

A married family doctor with 10 years' service, who has been paid £35,000 (including £400 in mileage allowances) and has paid an assistant £10,000, will have a net remuneration of £17,360. His pension will be £260 8*s*., and he will receive the same sum as a retirement allowance. If he dies, his wife will receive a pension of £86 16*s*. (If this doctor had stayed in the service for another five years at the same rate of pay, these sums would all be 50% higher).

A full-time consultant, after 10 years in the hospital service and earning £3100 p.a. for the last 3 of them, would receive on retirement a pension of £387 10*s*.

These figures are no more than a general guide, because there are many ways in which the position outlined above may be different in individual cases; thus service in the Armed Forces, employment of a trainee assistant, breaks in service, and the National Insurance scheme (those who opted for reduction of contributions on account of National Insurance will get a reduced pension) all affect the amount of pension payable. A doctor who is uncertain about his own position can get information from the Secretary, Ministry of Health, Health Services Superannuation Division, Government Buildings, Honeypot Lane, Stanmore, Middlesex; or, in Scotland, from the Department of Health for Scotland, Health Services Superannuation Branch, Broomhouse Drive, Saughton, Edinburgh, 11.

BRITISH PHARMACOPŒIA 1958

THE new edition of the *British Pharmacopœia*,[1] which will become official on Sept. 1, includes 160 additions.

New work on the clinical applications of antibiotics has led to the inclusion of tetracycline and oxytetracycline. Phenoxymethyl penicillin and benzathine penicillin (tablets and also an injection) are added in recognition of the occasional justification of oral medication with penicillin.

Experience of sensitivity reactions to local applications of penicillin doubtless accounts for the disappearance of penicillin ointments and cream from the official list. Erythromycin becomes official. Other antibiotics which are important but which have limited therapeutic uses are also included—bacitracin, neomycin sulphate, and polymixin B sulphate. The range of sulphonamides is increased by the addition of sulphamerazine and phthalylsulphathiazole. Few will deplore the disappearance of sulphanilamide and sulphathiazole.

Among the modifications of biological products is a new range of combined vaccines: diphtheria and pertussis vaccine; diphtheria, tetanus, and pertussis vaccine; and typhoid-paratyphoid A and B, and tetanus vaccine. Human γ-globulin qualifies for official recognition as a safe and more effective alternative to convalescent serum in the prevention or attenuation of several infectious diseases of childhood.

A considerable number of the new drugs listed are used principally in tropical medicine: chloroquine, primaquine, and amodiaquine are antimalarials; chiniofon sodium is a well-established remedy for amoebiasis; dapsone and solapsone are of value in leprosy; lucanthone is used in schistosomiasis; and there are many others. Hexylresorcinol, an anthelmintic in roundworm infestation, is reinstated. Piperazine preparations, which have proved valuable in threadworm infestation, are also given a place.

From the welter of anti-histamines those chosen by the Commission are antazoline, chlorcyclizine, diphenhydramine, and phenindamine. Chlorpromazine is also included, though its antihistaminic action is relatively unimportant—compared with its uses as an anti-emetic, to enhance the effect of analgesic drugs, and in certain psychiatric disorders.

Of the barbiturates, amylobarbitone, butobarbitone, and cyclobarbitone are added. Barbitone and hexobarbitone go out. It is odd that carbromal should have had to wait so long for official recognition as a relatively mild hypnotic. Pentolinium (for arterial hypertension) becomes official just when it is losing ground in favour of mecamylamine—which may be expected to become official in the next *Addendum*. The alkaloid reserpine, from the ancient drug rauwolfia, becomes official with a dose of 0·25–1 mg. daily; but the need for conservative dosage—in order to minimise the risk of producing psychiatric disorders—may raise misgivings about the drug before the *B.P. 1963* is published.

Endocrinology contributes the insulin zinc suspensions and preparations of hydrocortisone, prednisone, and prednisolone;

1. This is discussed in a leading article on p. 726.

and there is thyroxine sodium—a research tool rather than a necessary alternative to thyroid *B.P.* in clinical practice.

Neurologists have evidently convinced the Pharmacopœia Commission of the value of benzhexol, ethopropazine, and procyclidine in the management of parkinsonism, that mephenesin is worth a place in the treatment of tetanus, and that troxidone and paramethadione have, on balance, earned official approval in petit mal. Suxamethonium chloride is already widely used by anæsthetists as a short-acting relaxant of voluntary muscle.

New official drugs notable for their actions on the alimentary canal are the adsorbents (in gels and tablets) and spasmolytics such as propantheline bromide; and the revival of atropine methonitrate (now official) provides not only the physician's alternative to the Rammstedt operation but also the pharmacologist's oblique commentary on the spate of new synthetic spasmolytics. The inclusion of procainamide—used as an alternative to quinidine to prevent bursts of extrasystoles—and of noradrenaline acid tartrate is not surprising, but the replacement of amphetamine by dexamphetamine must have called for nice judgment.

Among the drugs which are best left in the hands of highly specialised practitioners is the cytotoxic substance mustine, used in Hodgkin's disease. Folic acid has necessarily achieved official status, but its very limited applications have also been realised.

The *B.P.* is by no means merely a physician's manual. The surgeon will find here a number of interesting items including absorbable dusting-powder, absorbable gelatin sponge, oxidised cellulose, dextran, hyaluronidase, and diagnostic agents.

Upwards of 130 drugs or preparations have been omitted. Clove, fennel, nutmeg, and quassia all take their leave—no doubt to the chagrin of older practitioners who will find no consolation in the offer of sodium radio-iodide (^{131}I) and sodium radio-phosphate (^{32}P).

Other deletions which are significant of the climate of opinion in pharmacology and therapeutics are arsenic trioxide and the organic arsenicals, the bismuth salts, mercurous chloride, tincture of digitalis, spirit of ether, and serum gonadotrophin.

Symposia

ANTERIOR-PITUITARY GLAND

A STUDY group met at the Ciba Foundation, London, on March 11, under the chairmanship of Prof. H. L. SHEEHAN (Liverpool), to review developments in knowledge of the anterior-pituitary gland.

Hormone Content

Dr. A. R. CURRIE (Glasgow) reviewed factors affecting the yield of hormones extracted from human pituitary glands obtained within four hours of death. Both the age and the sex of the patient influenced the content of gonadotrophins and of prolactin. In pituitary tissue of women in the reproductive period of life the gonadotrophin content was relatively low, while in glands obtained from women at or beyond the menopause the yield was some three or four times higher than that found in premenopausal patients. Gonadotrophic activity was also shown in pituitaries obtained from men; the content of stored hormone appeared to rise with advancing years. Prolactin activity could not be detected in the glands of young men or of women before the menopause; but in postmenopausal women and in men over 50 prolactin activity was present, the amount being greater in women than in men. In the case of the posterior-pituitary hormones, assays were conducted for pressor, antidiuretic, and oxytocic activities. In all the glands studied the pressor activity closely paralleled the antidiuretic activity, while the relation of the pressor to the oxytocic activity was very variable. The yield of posterior-pituitary hormones did not seem to be affected by age or sex or by trauma or other forms of "stress" immediately before death.

Acromegaly

Dr. P. M. F. BISHOP and Dr. J. H. BRIGGS (London) discussed the prognosis in about a hundred cases of acromegaly. 80% of these patients had died before the age of 60, most from cardiovascular causes. They concluded that the modern treatment of acromegaly was not sufficiently radical and that a higher proportion of patients should be treated earlier by surgical means.

Dr. R. LUFT (Stockholm) believed that hypophysectomy was most likely to be helpful in acromegalic patients who had concomitant hypertension and cardiovascular disease. Methods of assessing the activity of the disease were also discussed. Prof. A. QUERIDO (Leiden) found neither the estimation of serum-inorganic-phosphorus nor the urinary excretion of creatine to be of any value in this respect. Dr. P. J. RANDLE (Cambridge) pointed out that the plasma insulin-like activity, determined by the rat diaphragm test, was considerably higher in acromegaly than in health, and suggested that this estimation might be a useful index of activity.

Corticotrophin in Rheumatoid Arthritis

Dr. OSWALD SAVAGE (London) reviewed his experience with long-continued corticotrophin therapy in severe rheumatoid arthritis. In cases where, with such treatment, 17-hydroxycorticosteroid excretion rose appreciably, a satisfactory remission was usual. If, on the other hand, the corticotrophin therapy had little effect on corticosteroid output, the course of the disease was usually unaffected. Dr. Savage concluded that mild adrenal stimulation was of value in relieving the symptoms of severe rheumatoid arthritis, and was more satisfactory than oral steroids.

Gonadotrophins

Dr. A. C. CROOKE (Birmingham) said that in work on urinary gonadotrophins two assay methods were used, one depending on ovarian enlargement in intact mice treated with human chorionic gonadotrophin ("augmentation test") and the other on the mouse uterus test. The former method had been claimed to be specific for follicle-stimulating-hormone (F.S.H.) activity; the latter was not specific for either F.S.H. or interstitial-cell-stimulating hormone (I.C.S.H.) and probably provided a useful index of "total gonadotrophic activity".

He reported parallel assays by the two techniques in a woman during the normal menstrual cycle, and claimed that the ratio of urinary F.S.H. to urinary I.C.S.H. varied at different stages of the cycle. Dr. Crooke also described a method for the extraction of gonadotrophins from urine, based on the use of benzoic acid and tungstic acid, and claimed that this gave better yields than those obtained by the kaolin method.

Dr. J. A. LORAINE (Edinburgh) questioned the specificity of the augmentation test and pointed out the advantages of using a method, such as the hypophysectomised-

rat-prostate test, which was generally assumed to be specific for I.C.S.H. activity. He suggested that the most satisfactory procedure for extracting gonadotrophins from urine was the kaolin-acetone method with appropriate pH control, including, in the case of low-titre urines, the tricalcium phosphate step.

Anterior-pituitary Failure

Professor QUERIDO recalled that the earliest signs of pituitary failure were generally those due to absence of gonadotrophin secretion, and described a young woman and a young man showing hypogonadism only. He also described a family in which two brothers had symptoms attributable to thyrotrophin deficiency alone and in which several sibs were found to have abnormally low levels of protein-bound iodine in the blood.

Prof. P. A. BASTENIE (Brussels) described the use of a " coefficient of ^{32}P exchange " by red cells as a measure of the activity of thyroid hormone.

Prof. R. S. MACH (Geneva) noted that aldosterone secretion, determined by urinary assays, continued in patients with panhypopituitarism.

Report from Mayo Clinic

Dr. E. H. RYNEARSON (Mayo Clinic) discussed the endocrine complications in 153 patients subjected to operations on the pituitary. He emphasised that permanent diabetes insipidus was an unusual sequel except where damage extended high on the stalk.

His colleagues at the Mayo Foundation had prepared differential suspensions of isolated anterior-pituitary cells; he showed illustrations of single acidophil, basophil, and chromophobe cells prepared from rat pituitary tissue.

Dr. Rynearson reported 153 cases of Cushing's syndrome, 33 of which were due to adrenocortical tumour. In the remainder the cause was adrenocortical hyperplasia, and in 12 of these radiological examination showed the presence of a pituitary tumour. Of these 12, 7 were treated by total bilateral adrenalectomy and only in these patients was there evidence of progressive enlargement of the pituitary tumour after operation. In each of 5 pituitary glands subsequently available for histological examination, the predominant cells were found to be chromophobe.

Dr. LUFT remarked that in 5 of his patients with Cushing's syndrome there was evidence of pituitary enlargement; all were subsequently shown to have chromophobe tumours of the pituitary.

Pituitary Irradiation

Dr. J. H. LAWRENCE (Berkeley, California) described the results of pituitary irradiation in 50 patients mostly with advanced breast cancer. The apparatus, an 800 meV cyclotron, provided a stream of high-energy α particles. The total dosage administered to the pituitary ranged from 14,000 to 30,000 rads, but at present 22,000 rads was given over a period of two to three weeks. Pituitary function was assessed by urinary gonadotrophin and corticosteroid assays and by radio-iodine studies. In most cases it was found that pituitary activity declined some two months or more after treatment, but no attempt had been made to correlate the pre-treatment hormone levels with the response to therapy. No permanent nerve-damage was noted, though in some cases there were transitory visual-field defects.

Growth Hormone

Dr. LUFT, working in collaboration with Dr. D. IKKOS and Dr. C. A. GEMZELL, had observed the metabolic effects of human growth hormone (10 mg. a day) in a healthy subject, a patient with rheumatoid arthritis, and 3 juvenile diabetic patients who had previously been subjected to hypophysectomy for vascular complications.[1] In the healthy subject and in the patient with rheumatoid arthritis the effects of growth hormone were almost identical, and included striking retention of nitrogen, as well as some retention of phosphorus, potassium, sodium, chloride, and calcium. After periods of treatment of sixteen and twelve days respectively there was some rebound loss of nitrogen. In 2 of the diabetic patients administration of growth hormone was associated with rapid deterioration in their condition; blood-glucose levels rose sharply and glycosuria and ketonuria were much increased. In view of these complications therapy had to be discontinued after two days. In the 3rd diabetic patient there was evidence that the hypophysectomy had been incomplete; in this patient the deterioration under treatment with growth hormone was not apparent until the seventh day.

Prof. RUSSELL FRASER (London) referred to the effects of a similar growth-hormone preparation which had been made available for clinical trial in the United Kingdom by Prof. F. G. Young and his coworkers in Cambridge. Over very short periods of therapy results similar to those reported by Dr. Luft had been obtained.

Medicine and the Law

Medical Evidence of Diminished Responsibility

A LABOURER, aged 52, was convicted at Durham Assizes of the capital murder of a 15-year-old boy. At the trial the defence of diminished responsibility, under section 2 (1) of the Homicide Act 1957, was raised, and he appealed against his conviction on the ground that the verdict of the jury rejecting that defence was unreasonable and not supported by the evidence.

On appeal, his counsel said that three doctors were called for the defence. The evidence of a senior prison doctor was that the labourer was a sexual pervert lacking in moral responsibility, with a mental age of less than 10 years. The doctor had formed the view that the labourer was feeble-minded and had a psychopathic personality, and those two factors together constituted an abnormality of mind which substantially impaired his responsibility for his acts. A consultant psychiatrist had concurred in that opinion, and a third doctor had come to a similar conclusion. There was no medical evidence to the contrary. Counsel submitted that on that evidence no reasonable jury could have found other than that the labourer had been suffering from such an abnormality of mind as substantially impaired his mental responsibility for the crime he had committed.

On behalf of the Crown it was submitted that abnormality of mind was a variable and not a constant condition and therefore the onus was on the defence to establish to the jury on the balance of probabilities that at the time of the crime and not at any other time there was an abnormality operating on the labourer's mind which substantially impaired his responsibility. It was perfectly open to the jury at the end of the medical evidence to say that they were not so satisfied. The labourer's case must rest on the ground that the verdict was unreasonable.

1. Preliminary communications by Dr. Luft and his colleagues appear in this issue on pp. 720 and 721.

The basis of the medical evidence as to the abnormality of mind reducing mental responsibility was that it consisted of two ingredients—first, that the appellant was feebleminded and had the intellect of a boy of 10; and secondly, that he had a psychopathic personality. As regards the latter, the medical evidence was that it was episodic and recurrent. Taking into account the nature of the two ingredients constituting the abnormality and the whole of the circumstances of the case it was open to the jury to say that diminished responsibility had not been established. To say that they must be bound by the medical evidence would amount to dispensing with a jury.

The LORD CHIEF JUSTICE, after a short adjournment, said that the court would allow the appeal and substitute a verdict of manslaughter for the verdict of murder given at the Assizes. The reasons would be given at a later date. The sentence upon the appellant was that he would be imprisoned for 20 years.

REGINA *v.* MATHESON. *Court of Criminal Appeal:* Lord Goddard, *C.J.*, Streatfeild, Donovan, Slade, and Havers, *J.J.* March 24, 1958. George Waller, Q.C., and Peter Taylor (registrar, Court of Criminal Appeal); P. Stanley-Price, Q.C., and R. Rawden-Smith (Director of Public Prosecutions).

E. M. WELLWOOD
Barrister-at-law.

Diminished Responsibility Again

The new defence of diminished responsibility has been successfully pleaded in the case of Graham Harold Geer, a 17-year-old youth charged with the murder of his stepmother.[1]

Counsel for the defence told the jury that they would have to consider three points before they could return the verdict he asked for. They must feel sure that Geer was suffering from an abnormality of the mind at the time of the offence. If that was the case, they must decide whether it was caused by a disease. Thirdly, if it was abnormality of the mind caused by disease, did they think it substantially impaired his responsibility for the killing?

Dr. F. H. Brisby, principal medical officer at Brixton prison, said that Geer had been under his care from March 1 to 6. He had found that Geer was suffering from schizophrenia at the time of the killing. There was no doubt that the disease had impaired Geer's mind and had affected his responsibility for the killing.

Dr. T. C. N. Gibbons, consultant psychiatrist at the Maudsley Hospital, appointed by the Home Office to examine the accused, said that he entirely agreed with Dr. Brisby's diagnosis.

The jury found Geer not guilty of murder but guilty of manslaughter in accordance with section 2 of the Homicide Act, 1957.

The judge sentenced Geer to imprisonment for life, saying that he was concerned that there should be proper punishment and also provision for Geer's future. "I feel it right that I should give you such a sentence as will enable it to be reviewed from time to time. . . . I hope some time, and not too long, it will justify those responsible for you to allow you out again."

Compulsory Blood-test Refused

A husband, who is petitioning for divorce on the ground of the wife's alleged adultery, asked the court for an order to compel the wife to submit herself and her child to a blood-test with a view to obtaining evidence of the child's paternity. A Scottish judge refused to make such an order and his decision has been upheld by three appeal judges.[2] In the words of one of the appeal judges, the proposed order would be "an invasion of private right which is not consistent with our present methods".

Lord Thomson said that the most plausible way in which the argument for the husband could be put was to say that, owing to a new medical technique, evidence might be made available which would assist the court in discovering the truth. It was in the interest of justice that the truth should be discovered; this method was scientific and objective and it was just obscurantism on the part of a court to refuse to avail itself of it.

His Lordship considered, however, that this way of putting the argument obscured and misrepresented the problems presented. They were not asked to say anything about the value of such evidence. What the husband was asking the court to do was to compel the opposite party to the action to bring forward evidence which under normal circumstances she would not be under any obligation to furnish. Moreover, it was evidence which could bring little advantage to the defendant, whereas it might be used strongly against her.

His Lordship also referred to the problem of enforcing such an order. Enforcement would mean the compulsory infliction of a surgical operation—a minor one, no doubt, but nonetheless an invasion of the person of the wife—or, if the court were not prepared to go that length, it would have to regard her refusal as a contempt of court.

As to the child, Lord Thomson said that it seemed to him impossible, on any view of the problem, to compel a third party to undergo an operation in order to provide evidence for a plaintiff or a defendant.

Lung-cancer Damages Claim

A New Orleans woman is suing two American tobacco manufacturers for $700,000 on the ground that her husband died from lung cancer caused by smoking their cigarettes. His vocal cords had been removed in October, 1954, because of cancer, and he died of lung cancer in July, 1955. The judge declared a mis-trial because some members of the jury had received telephone inquiries as to their smoking habits; the trial is unlikely to come up again before November.[1]

The widow says that her husband died of lung cancer in 1955 after smoking two packets of cigarettes a day for forty years, and claims that the defendants were negligent in failing to give warning about the deleterious effects of their product. The defence will, it is understood, be based on a charge of contributory negligence on the ground that the deceased did not exercise due care in his smoking habits.

Public Health

Vital Statistics for 1957

IN his latest quarterly return[2] the Registrar General gives some provisional figures for England and Wales in 1957. The live-birth rate was 16·1 (highest since 1949) and the death-rate 11·5 per 1000 (0·2 less than in 1956). The infant-mortality rate was 23·0—0·7 lower than in 1956, the previous low record.

In the last quarter of 1957 the influenza epidemic was manifest in the death-rates of 924 (450) per million from pneumonia and 496 (23) from influenza; the tuberculosis death-rate was 135 (112). (Previous year's figures in parentheses.)

The population at June 30, 1957, is estimated at 45,043,000; it is expected to increase to 50,370,000 in 1997. The excess of females was 1,479,000 in 1957; this figure is expected to fall to 556,000 in 1997.

1. *Kent and Sussex Courier*, March 21, 1958.
2. *Scotsman*, March 1, 1958.

1. *N.Y. Times*, March 23, 1958. *Times*, March 26, 1958.
2. Registrar General's Quarterly Return for England and Wales: quarter ended Dec. 31, 1957. H.M. Stationery Office. Pp. 26. 2*s*.

In England Now

A Running Commentary by Peripatetic Correspondents

"SHAN'T be long," said my friend; "the meeting will be over in half an hour and then we can have a gossip with the chaps." I sat down on the hard bench. My eyes slowly became accustomed to the gloom. I became aware that I was not alone. Not by any means, for there in a gigantic glass case along the wall, unlit and unlabelled, stood glowering, not one, nor even two, but a whole row, almost a platoon, of giant skeletons. I was suitably impressed. My first thought was that some past member of the staff had been a gorilla hunter in his spare time. And what a hunter, what a bag! For the five largest skeletons, if I was not mistaken, were clearly members of the same family.

But on closer inspection I began to waver. There were no bullet marks anywhere and in the case were several pygmy apes which no self-respecting gorilla hunter would ever shoot, much less put in a glass case. So my thoughts turned to anthropologists, who, after all, are only frustrated gorilla hunters. Could this be one of those demonstrations illustrating the Descent of Man? But if so, at which end of the series did one start? True the gorillas were right for size and one had the blackened teeth of a confirmed smoker, but on the other hand the only skeletons with measurable brain pans were the pygmies with long tails—the gorillas were just solid bone from the neck up. It was all very difficult. Also where was the photograph that tradition demanded showing the anthropologist, capped and gowned, with one hand laid fondly on the skull of the missing link? Where were the labels and the book of words? Whoever heard of an inarticulate anthropologist?

Perhaps, I reflected, it's only a job lot of monkeys. After all, why should I expect a medical school of all places to keep its skeletons in cupboards? The minutes ticked on, thirty, sixty, ninety. Could it simply be that the traditional way of shaking off the unwelcome visitor was to arrange to meet him here and then quietly disappear, leaving the exhibit to do the rest? I looked again at those empty orbits. My spine sagged. But I had maligned my friend. "Ah there you are," he said, turning up only an hour late. "Come and see this old photo of Bayliss and Starling and Sydney Ringer; look at those handlebar moustaches; doesn't that one look like a billiard marker? What about this?" he said proudly, knocking over a cup of tea and pointing to the framed strips of toilet roll on which the impecunious but resourceful young W. B. Cannon had traced his first radiographs of the stomach. "And," he concluded pointedly, "do stop walking around as though you were going to touch the ground with your knuckles. It wasn't my fault the meeting went on so long. Kindly remember that you are in England now."

* * *

John said we hadn't a hope in the M.R.C.P. because of lack of clinical material. We are psychiatric registrars and our stethoscopes were seldom out of our pockets.

"We'll find our own clinical material," I said.

"Where?"

"Here, in the psychiatric clinic."

It was hard work at first, but it taught us to do thorough examinations quickly. Gradually we built up our clientèle. Even John was impressed at the amount of underlying pathology we found in psychiatric patients. Monday was the day for our cardiac clinic. Patients with murmurs in their hearts attended regularly and physical check-ups were combined with their usual treatment. Tuesday was reserved for neurology, Wednesday for metabolic diseases, and Thursday for obscure physical signs. On Fridays we salved our consciences and saw patients in physical health.

Our knowledge of clinical medicine increased rapidly. Moreover, during those months we correctly diagnosed five carcinomas, one endocarditis, and a parathyroid tumour, all in need of urgent treatment. But the interesting result of our new methods was the improvement in the psychiatric condition of our "special" patients. Even some of the chronics improved so much that reluctantly we felt obliged to discharge them.

Now that we are M.R.C.P.s these unusual psychiatric techniques have been modified. We couldn't keep it up for ever, but we regard it as a successful experiment from all points of view.

* * *

I've got flu, and for four days my temperature has been over 101. I can't lift my head from the pillow, but during that time I have mapped out in my mind a new investigation on the development of antibiotic resistance in the staphylococcus, the plot and a lot of detail for a novel which I know will be a best-seller, and two anecdotes for the peripat. When my temperature gets down to normal I know the investigation won't get much further, the novel idea will be dustier than its projected jacket, and the peripatetic contribution will be one of the ones the editor files instead of publishing. But when I look back, I have discovered that, if I have made any original contributions to anything, the three I like best were all conceived when in bed with a cold. Is it the idleness, or is it the temperature? You know the perennial argument on creative energy and the tubercle bacillus. With tuberculosis a dying disease, are we to rely on the influenza virus for our inspiration?

* * *

Entering the field of clinical psychology for the first time one is faced by a bewildering array of tests, subtests, and questionaries measuring every imaginable (and the odd unimaginable) human function. Clerical speed, finger dexterity, manual dexterity, and symbolical manipulation, to mention but a few, yield their secrets to indices of significance, deviation, and standard error. One is happily the donor rather than the recipient; but even so the use of the vocabulary test is a humiliating experience, especially where the patient casually guesses his way to the bottom of the column and one has to consult a dictionary to know if he is right. Sadly one discovers that I.Q.s of over 120 depend on a knowledge of words one has never heard of, let alone understood. A post-psychological depression sets in, but as the delusions of inferiority recede one asks oneself: "Why?" Our test-key tells us that "minatory" means "threatening" and "traduce" means "misrepresent". O.K., so why bother with the former words at all? And the same to putative, heuristic, and the lot of the 120-plus words. Some complex technical words are needed, and we are used, of course, to professorial perorations (sorry, speeches) which include the occasional lexicographic peculiarity. In general, though, I feel that words incomprehensible to more than 1 in 400 don't help. I have therefore devised a formula for dealing with semantic extravaganzas of obscure comprehensibility. I call it the commonsense test (my sense being remarkably common). If I can't follow an author without dragging along the *Oxford Dictionary* (2 vols.), I consider it's a lot of rot.

* * *

The R.S.O. was a gentle person, and it was with diffidence that he knocked on the door. The Hospital Board was in full session.

"I came about the operating-table, sir."

"Yes."

"It is a wooden one. We've had it forty years, and it has none of the things operating-tables ought to have. After forty years, you know, it's getting rather—high."

"I think you came to us last year about it, too, Mr. ——?"

"Yes, actually, I did."

"We remember. We pointed out then, of course, that a new one is expensive—most expensive. But we are sympathetic about your request. We will give it every consideration."

"Thank you, sir."

"All right, Mr. ——. Good afternoon to you."

"Shall I come next year, sir?"

"By all means, my dear fellow. By all means."

A little later, with equal diffidence, he knocked on the door again. The meeting was still in full session.

"I came about the operating-table again, sir."

"Have we not met already on the subject, Mr. ——?"

"But we've had it forty years. It's a *wooden* one."

"And we have heard this already, Mr. ——."

"Yes, sir, but the situation is somewhat changed. I have just been to the theatre, and I have chopped it up. Good afternoon to *you*, sir."

Letters to the Editor

CONSULTANT DISTRIBUTION, WAITING-LISTS, AND UNDEREMPLOYED SENIOR REGISTRARS

SIR,—Many fully trained senior registrars remain inadequately occupied while the profession and the Ministry fail to respond to the needs of the community or the plight of the registrars. However, facts are gradually emerging to prove the inequity of consultant distribution which many of us have suspected for years.

Replies from the Minister of Health on Jan. 26, 1958, elicited this information:

Region	*Waiting-list*	*Average annual cost of consultant salary per bed*
Manchester	56,734	£28·5
Sheffield	51,960	£33·6
N. W. Metropolitan	36,447	£45·8

On March 10 the following facts emerged in answer to a question on staffing of beds for mental illness:

Region	*Beds*	*Consultants as whole-time units*
Manchester	13,019	18
Birmingham	13,758	36
N. W. Metropolitan	11,848	42

These contrasting figures are extremely difficult to relate to community needs, for social conditions would suggest the probability of a higher morbidity incidence in those regions with the lowest consultant ratios. It is extremely difficult to hold the Ministry of Health responsible; for ten years regional boards have been at liberty to devote each year what was considered an adequate sum to provide for the expansion of consultant staffing. The total allocation from the Ministry may have been inadequate but the method of spending this total was within the boards' jurisdiction.

In many regions very powerful medical advisory committees have had great influence on board policies.

We in the profession have failed to equate consultant supply to the needs of the population. The Ministry has failed to give money, encouragement, and advice in the matter. It is essential that action should be taken to break this impasse. An impartial committee, under a lay chairman, should review the situation speedily and make proposals to the Ministry and regional boards which will ensure a balanced medical service and help to eradicate an unsavoury situation which is not inherent in a national health service.

Central Middlesex Hospital,
London, N.W.10. HORACE JOULES.

*** Our parliamentary report on p. 748 gives regional figures for consultants and staffed beds.—ED. L.

A FUNCTIONAL NECESSITY

SIR,—The answer to the "registrar problem" is quite simple. After an aspiring specialist has completed the senior house-officer, registrar, and senior registrar appointments he should be eligible to be appointed "consultant". This appointment would be similar in status to that of assistant surgeon or physician in the teaching hospitals before 1948. There must be enough of these appointments to absorb every senior registrar. "Weeding out" should be done at registrar level. The qualifications and experience necessary for "consultant" would be those now found in senior registrars in their third or fourth year or in the better S.H.M.O. appointments. The salary scale would by present standards be in the range £1700 to £3000. At the age of 45 years or after 20 years in the specialty a limited number of consultants—say, 20%—who had exceptional qualifications or who had made valuable contributions would be eligible to apply for the appointment of senior consultant with a salary range of £3000 to £4000. This scheme would:

(1) Remove unsuitable specialist material at a level when it is not too late to go into general practice or allow aspiring general practitioners to take registrar appointments before going into general practice.

(2) Solve the problem of redundant senior registrars.

(3) Remove the unfair gap that sometimes exists between the well-qualified S.H.M.O. and the well-qualified consultant of about 35. Often whether a man is an S.H.M.O. or consultant is a pure gamble.

(4) Remove the iniquities of the merit-award system.

I might add that at the moment I have no axe to grind since I am a fairly contented S.H.M.O.—a rare bird, so it appears. I should rather wait a while as an S.H.M.O at my present hospital than be a consultant at certain hospitals I know. But, of course, if my suggestions were put into practice I should be even more content.

Leicester. HUMPHRY B. KIDD.

TREATMENT OF BREAST CANCER

SIR,—In your leading article of Feb. 1, you say that "a strong challenge [to Professor McWhirter] now comes from the Mayo Clinic" where [1] in patients treated mainly by radical mastectomy in 1941–47, the five-year survival was 59·3% as compared with 48·1% in McWhirter's group treated in the same period mainly by simple mastectomy and irradiation. You also say that "comparison between the figures from the Mayo Clinic and those from Edinburgh is difficult", because in the Mayo Clinic series cases not operated upon were not recorded whereas "257 inoperable cases were included in McWhirter's results".

In his article,[2] referred to by Berkson et al. of the Mayo Clinic, McWhirter breaks down his total experience into 3 categories:

1. Operable (by ordinary standards for radical mastectomy): 1063 cases, 58% living 5 years. (This figure is almost the same as the 59·3% survival-rate of the Mayo Clinic's radical mastectomy series.)
2. Locally advanced: 546 cases, 30% living 5 years.
3. Distant metastases: 273 cases, 4% living 5 years.

It is clear that Berkson et al. compared the results obtained in the Mayo Clinic's operable cases with a group of McWhirter's cases that included both locally advanced (inoperable) and operable cases. The result, therefore, is not (as you state) failure to consider "the 257 inoperable cases". It is total disregard for McWhirter's 546 patients with advanced and inoperable local disease.

Reference to McWhirter's tables and to the Mayo Clinic's tables of five-year survivals shows that similar results were obtained by the two different methods of therapy:

	Five-year survivals	
	Mayo Clinic	*McWhirter*
All operable cases	59·3%*	58%
All operable cases under 65 years of age ..	58·9%*	60%

* Operative deaths not included.

Again it appears that in breast cancer the selection of cases for comparison has more influence on published results than the method of treatment given.

Department of General Surgery,
Cleveland Clinic,
Cleveland, Ohio. GEORGE CRILE, JR.

1. Berkson, J., Harrington, S. W., Clagett, O. T., Kirklin, J. W., Dockerty, M. B., McDonald, J. R. *Proc. Mayo Clin.* 1957, **32**, 645.
2. McWhirter, R. *Brit. J. Radiol.* 1955, **28**, 128.

MITRAL VALVOTOMY AND PREGNANCY

SIR,—In their paper on mitral valvotomy and pregnancy, Dr. Wade and his colleagues raise a number of points concerning which our experience may be of interest. In their series of 12 cases of valvotomy during pregnancy there was 1 maternal death, a number of serious complications, and 4 cases in which stenosis of the mitral valve was not severe. 2 cases of valvotomy during pregnancy were reported,[1] and of our 400 consecutive patients subjected to mitral valvotomy in the past seven years, 10 were pregnant at the time of operation. In this series of 10 there have been no maternal deaths and no important postoperative complications. The 3rd patient had relatively mild stenosis (2 cm.), and it was her case which prompted a review of the criteria for operation. These two series are small but the published cases now number 97, and the fact that there have been 2 maternal deaths and some serious complications suggests that there may be an increased risk in operation at this time. In this particular age-group (under 45) and with sinus rhythm our operative mortality has been less than 1%.

In regard to the 4 patients in whom the stenosis was not severe, Dr. Wade and his colleagues state that operation would not have been advised apart from pregnancy and these patients could have been managed medically. They also state that if symptoms are severe enough and the valve is technically suitable, valvotomy is the treatment of choice. However, as they indicate, the increased blood-volume and cardiac output which occur in pregnancy greatly increase the resistance to blood-flow at the mitral valve. Therefore symptoms during pregnancy may be out of all proportion to the stenosis and are, in themselves, an unreliable guide to the benefit which may accrue from operation since it may not be possible to enlarge significantly an orifice which is only moderately stenosed. In our opinion, the criteria for recommending operation during pregnancy are a history of progressive dyspnœa before pregnancy and objective evidence of tight stenosis—that is, an electrocardiographic pattern of right ventricular hypertrophy and radiographic evidence of enlargement of the pulmonary artery and its main branches. Basal transverse lines from distended lymphatics and an increased pulmonary arterial pressure as recorded by cardiac catheterisation during pregnancy are as unreliable as the severity of the symptoms.

The point as to whether the valve is "technically suitable" is also worthy of consideration because, in our experience, the concept of the "pliant valve" is open to question.[2] It is true that it is among those with "clear signs"—i.e., a loud first heart sound and opening snap and a rumbling mid-diastolic murmur—that valves readily amenable to valvotomy will be found, but in this group there will also be many with tough, rigid valves in whom it is difficult to achieve a satisfactory result. All that can be done is to ascertain that the degree of stenosis is considerable and then the patient must have what amounts to an exploratory cardiotomy. Fortunately, in most cases, despite a rigid valve, a worth-while degree of splitting of the commissures can be obtained, especially with the aid of a transventricular dilator, and substantial benefit follows. However, it must be remembered that even a technically successful valvotomy usually leaves a valve which is far from normal, and this will account for the fact that fairly severe symptoms may recur during pregnancy despite operation.

The natural reluctance of a mother to be parted from her infant in its first months is, as we have emphasised, in favour of valvotomy during pregnancy in suitable cases to avoid postponement of the operation for more than a year from the initial examination.

In summary, then, surgery during pregnancy is undesirable unless the evidence for tight stenosis is based on severity of symptoms before pregnancy began or objective signs of longstanding pulmonary hypertension, but if these are present there is no contraindication to operation and usually the time is domestically convenient.

Edinburgh. RICHARD TURNER.

1. Logan, A., Turner, R. W. D. *Lancet*, 1952, i, 1286.
2. Turner, R. W. D., Fraser, H. R. I. *ibid.* 1956, ii, 525, 587.

MODIFIED TRACHEOTOMY TUBE

SIR,—In your issue of March 15 (p. 569), Dr. Frank Wilson describes a modified tracheotomy tube, the essential feature of which is an opening on the convexity of the outer cannula that allows, when the anterior aperture is occluded, re-establishment of the natural airway through the larynx. Tubes of this type were made for and used by me over twenty years ago in the treatment of laryngeal diphtheria.[1]

In those days of fairly frequent tracheotomy some children had difficulty in dispensing with the tube owing to spasm of the larynx or to fear of choking. The special open-back cannula was devised to allow them practice in natural breathing while retaining the safeguard of the tracheotomy tube. Somethimes this took several weeks, and one child of two years wore his tube for almost a year before discovering that he could do without it. No special occluder was used: one simply covered the aperture with a piece of adhesive plaster.

I still have the tubes in my possession, but with the decline of diphtheria have had no occasion to use them for a very long time.

Infectious Diseases Hospital, Paisley. WILLIAM NAPIER.

1. Napier, W. *Lancet*, 1937, ii, 673.

INFANTILE GASTROENTERITIS

SIR,—I am pleased to see that Dr. Giles (March 8) acknowledges my position in the matter of the relationship of *Escherichia coli* to gastroenteritis; but I do not think I misrepresented him, although I am prepared to accept that he has changed his views since 1948 when he and Dr. Sangster wrote[2]: "In view of our failure to demonstrate the pathogenicity of the agglutinable coliform, the possibility remains that the organism is merely a constant concomitant of a hitherto undiscovered virus, comparable with the presence of *B. suipestifer* in the virus disease of hog cholera. All efforts to demonstrate such a virus have as yet been unsuccessful"; and again, "Recovery of the previously described type of *B. coli* in the fæces of an infant suffering from diarrhœa affords, in our opinion, strong presumptive evidence of at least one variety of primary gastroenteritis, *but whether its presence in over 90% of cases is of true ætiological significance remains to be seen*" (my italics).

Dr. Giles asks what are my reasons for doubt, despite the published work of the past ten years. Most of this work merely aims at confirming the presence of *Esch. coli* serotypes in the stools without attempting to explain their presence there. I recall no fundamental work on the normal bacterial flora of the infant gut stemming from this. When does this flora change and why? Does it differ materially in the breast-fed or bottle-fed infant? *Esch. coli* is regarded as a normal bowel inhabitant: what factors predispose to a change in its character? Why should it apparently behave so differently from other known bacterial gut pathogens, such as the salmonellæ and enteric groups?

For a fæcal-borne pathogen to travel through the air with the speed ascribed to it seems incredible, unless all rules of hygiene are disregarded. The infant's stools are fluid and are not normally left long enough to dry; and dry dust seems the

2. Giles, C., Sangster, G. *J. Hyg., Camb.* 1948, **46**, 7.

only valid medium. Indeed Hutchinson [3] states that there is insufficient evidence to show that infection spreads in hospital by means of ward dust.

A significant proportion of infants are symptomless excretors: why should not this represent the normal? If not, what causes the change? Enteric viruses have now been recognised (e.g., Echo group, poliomyelitis); and to my mind such a virus seems to explain the rapid spread and explosive outbursts better than a bacterium.

There are many other questions to be answered. I can only echo Lord Evans' words [4]: "It is difficult to be entirely convinced that what appears on the culture plate in the laboratory is necessarily the same as happens in the patient."

Ilford Isolation Hospital,
Chadwell Heath,
Romford, Essex. I. M. LIBRACH.

NYLON-DARN REPAIRS OF HERNIÆ

SIR,—Mr. Doran (March 22) makes a plea for the scientific approach to surgical problems and immediately takes the very unscientific step of distorting the evidence to suit his argument. The claim which he attributes to me, that a chronic sinus with monofilament nylon is almost unknown, is a travesty of the statement which I made (Feb. 22)—which was that a chronic sinus following the use of the finer sizes of monofilamentous nylon is almost unknown in my experience. He claims that my findings were diametrically opposed to those of Mr. Marsden (March 8)—and Mr. Marsden himself appears to think so too—but as I see it we both found that thick monofilamentous nylon not infrequently caused chronic sinuses. Indeed, the findings of all your correspondents on this subject are compatible with my observation that thick nylon sometimes causes sinuses and thin nylon does not.

It appears, therefore, that the premise on which Mr. Doran's disputation is based is false.

Manchester. HERBERT HAXTON.

THE DOCTOR'S ATTITUDE TO HIS PATIENT

SIR,—In his letters of March 1 and 22, Dr. Ryle criticised Dr. Clyne (Feb. 1) and castigated Dr. Pasmore (March 8) for views which he states "insist upon a subjective approach which withdraws psychiatry from the arena of science". He is all for "detached scientific observations of the cause of neurosis"—and who is not?

But the only instrument of the would-be detached scientific observer in this field, both for investigation and treatment, is his own personality, imperfect though that may be. To use this as effectively as possible the personality must be studied, altered, and allowance made for individual bias. How this can be done other than subjectively I do not understand.

Although Dr. Ryle writes in his first letter that "the doctor's personality plays a very important part, and should be understood", he underestimates the importance of this vital fact, and his belief that only some doctors need attempt to adjust personality difficulties is a delusion. Doctors do not spring at birth like Athene from the head of Zeus, free from the disabilities of the unconscious mind. We are made from the same stuff as the rest of humanity.

By ignoring this Dr. Ryle is not advancing to the scientific goal which he seeks, but is maintaining what is now an outmoded obscurantism, based on his earlier training, as Dr. Pasmore deduces in his letter.

Sittingbourne, Kent. F. M. MALLINSON.

3. Hutchinson, R. I. *ibid.* 1957, **55**, 38.
4. Evans, H. *Trans. med. Soc. Lond.* 1957, **73**, 37.

BED REST, THROMBOSIS, AND EMBOLISM

SIR,—Your leading article of March 1 surveys venous thrombosis and pulmonary embolism in patients at rest in bed after operation. Like most British writers on the subject, you do not refer to pulmonary emboli that arise from unsuspected leg-vein thrombosis in patients who are not confined to bed, but who are walking about and doing their ordinary work. Long recognised in America,[1] these are common enough in this country to be clinically important, and any attempt to explain pulmonary emboli must take them into account. In concentrating on the postoperative cases, which are only part of the picture, it may be that some ætiological clue is being overlooked. Small pulmonary emboli in ambulant people are usually diagnosed as pneumonia. (It is not so long since small postoperative emboli were similarly misinterpreted.) Large ones, if not immediately fatal, may be taken for painless myocardial infarcts. I record in the accompanying table details of 11 cases of this type referred to me during the past six years. All had multiple emboli, and the legs were outwardly normal, except for varicose veins in case 9. Cases 1–4 have been published elsewhere.[2]

PULMONARY INFARCTS IN AMBULANT PATIENTS

Case no.	Age	Sex	Clinical features	Outcome
1	47	M	Dyspnœa	Necropsy: multiple emboli; thrombosis left soleus
2	50	F	Dyspnœa, triple rhythm, E.C.G. of acute cor pulmonale	Necropsy: multiple emboli; thrombosis both popliteals
3	49	M	Pain, dyspnœa	Necropsy: multiple emboli; thrombosis both femorals
4	47	M	Recurrent "pneumonia" ×5	Cure by femoral-vein ligation
5	66	F	Recurrent "pneumonia"	Necropsy; multiple emboli; thrombosis left popliteal
6	71	M	"Pneumonia"	Responded to anticoagulants
7	75	F	Dyspnœa	Necropsy: multiple emboli; thrombosis left posterior tibial
8	66	M	"Pneumonia"	Necropsy: multiple emboli; thrombosis femoral
9	36	M	Pleurisy ×2, lung abscess	Cure by ligation of common iliac vein
10	54	M	"Pneumonia" ×2	Cure by ligation of inferior vena cava
11	43	M	Pain, dyspnœa, 3 attacks; triple rhythm	Responded to anticoagulants

I have not included 16 patients admitted to my wards during the same period in whom pulmonary embolism had arisen, while they were ambulant, from an obvious swollen leg. These were not severe, and rarely recurred. Since diagnosis presented no difficulty, anticoagulant treatment was started at once.

Pulmonary infarction from small emboli is marked by pain, hæmoptysis, and fever, with pleural rub or consolidation on examination. Pneumonia suggests itself, but if the symptoms recur after an interval, and particularly if they change sides, an embolic origin must be considered and must not be discarded, as so often it is, because of the apparently normal legs. The expected response to antibiotics is of course lacking. The appearance of the chest radiograph is often inconclusive. Large emboli differ in producing severe dyspnœa, jugular venous distension, and triple rhythm, without local signs in the lungs clinically or radiologically. The electrocardiogram may help here: in case 2 it was diagnostic, and in case 11 right bundle-branch block was a valuable pointer.

When diagnosis was made I have relied on anticoagulants in the first instance, but recurrence after withdrawal of treatment has compelled interruption of veins in cases 4, 8, and 10. It is clear that some of these patients must have either permanent anticoagulant treatment or venous ligation. No effective treatment had been undertaken in those who died.

1. Homans, J. *New Engl. J. Med.* 1934, **211**, 993.
2. Petch, C. P. *Arch. Surg. Chicago*, 1955, **71**, 912.

Rest in bed played no part in the production of these invisible thromboses, which had such serious effects, nor did other factors that have been claimed to operate, such as sitting in cramped positions in cars or aircraft. No instance of malignant disease appeared either in necropsy or follow-up. To describe such thromboses as "spontaneous" is to beg the question of their origin: to explain them might throw light on the even more serious problem of postoperative emboli.

St. Helier Hospital,
Carshalton, Surrey. C. P. PETCH.

ESSENTIAL FATTY ACIDS, LIPID METABOLISM AND ATHEROSCLEROSIS

SIR,—In your issue of Feb. 15 Dr. Kinsell and his colleagues discuss the serum-cholesterol-lowering effect of certain fatty acids and make the surprising statement (p. 338) that we (Keys et al.) and Ahrens et al.[1 2] "have advanced the hypothesis that double bonds furnished by fatty acids are responsible for the effects observed—i.e., sufficient oleate would be quite as effective as linoleate or arachidonate. Our studies do not support such a hypothesis."

As a matter of fact, this question of effect or lack of effect on serum-cholesterol of dietary oleic acid has been a matter of friendly but rather vigorous controversy between Ahrens et al. and ourselves for the past year, notably at major symposia organised by the American Medical Association Council on Foods and Nutrition (New Orleans, March 15, 1957) and by the American College of Physicians (Boston, April 10, 1957), and at the Cleveland Symposium on the Chemistry of Lipides (May 7, 8, 1957).

Shortly before the article by Kinsell et al. appeared, the Cleveland Symposium was published [3] and in this Ahrens et al. discuss our publications and views at some length and state that we (Keys et al.) "conclude further that the mono-ethenoid acids (almost entirely oleic acid) are neutral or totally lacking in effect, since a term describing the content of oleic acid in the dietary fat need not appear in the prediction equations."

We have summarised [3] our analysis of the results in 41 sets of controlled dietary comparisons, each involving 12 to 27 men on each of two diets differing in fats, which yielded the prediction equation for the response of serum-cholesterol concentration to a dietary change in fats:

$$\tilde{\Delta}\ \text{Chol.} = 2{\cdot}73(\Delta S) + 0{\cdot}01(\Delta M) - 1{\cdot}31(\Delta P)$$

where S, M, and P are the percentages of the total diet calories provided from saturated, mono-ethenoid, and poly-ethenoid fatty acids, respectively, and the Δs are the differences between the two diets being compared. We noted that "The contribution of the term for ΔM is statistically non-significant and recomputation with this term omitted yielded the equation:

$$\tilde{\Delta}\ \text{Chol.} = 2{\cdot}74(\Delta S) - 1{\cdot}31(\Delta P)."$$

Further, we stated, "Whether the mono-ethenoids (essentially oleic acid) have any effect is uncertain, but if there is an effect it is certainly small." Full details of the diets, methods, findings, and statistical analyses in these experiments covering the period 1951–56 have been published.[4 5]

Kinsell et al., besides misquoting us, report two instances in which they compared the effects on serum-cholesterol of oleic acid and linoleic acid in the diet.

In the first, in a boy aged 19, at the end of three weeks on a formula diet containing 80 g. of ethyl oleate daily the serum-cholesterol level was about 65 mg. per 100 ml. higher than at the end of two weeks when the formula contained 80 g. of ethyl linoleate.

In the second, a diabetic patient on a similar formula diet had a serum-cholesterol of 270 mg. per 100 ml. at the end of a week when the daily diet contained 75 g. of trilinolein, 235 mg. at the end of two weeks in which the diet contained 75 g. of triolein instead of the trilinolein, and 297 mg. at the end of three weeks when 75 g. of ethyl oleate was substituted.

We regret that these observations scarcely qualify as acceptable confirmation of our own findings and interpretation, though they are not in opposition.

More to the point are two new sets of data from our own controlled dietary experiments which will be reported in full in due course but may be mentioned here.

First, a switchback dietary experiment on 22 men, rigorously controlled for six weeks, conclusively showed no effect on serum-cholesterol from substitution of 68 g. of oleic acid glyceride daily for 612 calories of carbohydrate or from the reverse substitution.[6]

Second, we now have 12 additional sets of dietary comparisons, each involving 5 to 25 men on each of two diets differing only in the kind of fat or in the isocaloric exchange of fat for carbohydrate in the diet. Least-squares multiple regression analysis of the data in the same manner as reported previously [4 5] produced coefficients in a prediction equation statistically indistinguishable from those found in the earlier 41 sets of experimental comparisons, and again the mono-ethenoid (oleic acid) variable makes no statistical contribution (i.e., zero effect).

The conclusion is, as before, that saturated fats raise the serum-cholesterol level when isocalorically substituted for carbohydrate, that polyunsaturated fatty acids lower it, and that about 2 g. of linoleic acid is needed to offset the effect of 1 g. of stearic or palmitic acid. Finally, and again as before, we conclude that oleic acid has no significant effect in either direction; oleic acid glyceride is substantially equivalent to simple carbohydrate in effect on serum-cholesterol.

We have noted that oleic acid accounts for practically all of the mono-ethenoid fatty acid in the great majority of natural food fats and oils. Rape-seed oil, which contains up to half of its fatty acids in the form of the mono-ethenoid erucic acid (a 22-carbon mono-ethenoid, docos-13-enoic) is an exception. We have no experience with rape-seed oil, but the data in the recent report by Linko,[7] though inadequate for exact computation, suggest that erucic acid, like oleic, is "neutral" in respect to effect on the serum-cholesterol level in man.

Ahrens et al.[2] admit that their data are in conformity with computations from our prediction equation (published before their data appeared), but object that, "Keys' prediction could have been expressed just as accurately, and less mysteriously, in terms of iodine value of dietary fat." This is just as palpably erroneous as the misquotation of Kinsell et al. The iodine value is, of course, merely a measure of the number of double bonds in 100 g. of fat, whereas our equation ignores the double bonds in mono-ethenoid fatty acids and, in any case, refers to the amount of fat calories as a percentage of calories from all sources in the diet.

Ahrens et al. may have been misled by the fact that in their experiments, in contrast with our own, they usually deal with the same amount of total fat and vary only the kind of fat. In that situation there is often a rough relationship between the iodine value and the expression $2S - P$, which is an approximation to the right-hand term in our equation given above. But even when the total fat is constant the iodine value does not correspond precisely with our formulation.

Consider a 3000-calorie diet in which there is a total of 133 g. of fatty-acid glycerides, half being saturated and half being linoleic acid. Let us now change the diet only by replacing these fatty acids with 133 g. of oleic-acid glyceride (i.e., triolein). Note that fats yield

1. Ahrens, E. H., Jr., Hirsch, J., Insull, W., Jr., Tsaltas, T. T., Blomstrand, R., Peterson, M. L. *Lancet*, 1957, i, 943.
2. Ahrens, E. H., Jr., Hirsch, J., Insull, W., Jr., Peterson, M. L. *in* Chemistry of Lipides as related to Atherosclerosis (edited by I. H. Page); p. 222. Springfield, Ill., 1958.
3. Keys, A., Anderson, J. T., Grande, F. *Lancet*, 1957, i, 787.
4. Anderson, J. T., Keys, A., Grande, F. *J. Nutr.* 1957, **62**, 421.
5. Keys, A., Anderson, J. T., Grande, F. *Lancet*, 1957, ii, 959.
6. Keys, A., Anderson, J. T., Grande, F. *Proc. Soc. Exp. Biol., N.Y.* 1958 (in the press).
7. Linko, E. *Acta med. scand.* 1957, **159**, 474.

1200 calories of the total 3000, or 40%, in both diets, and, in our terms, we have values of S=20 and P=20 with the first diet and S=0, P=0 with the second. The iodine value will be identical in the two cases (=86) and, according to Ahrens et al., there will be no change in serum-cholesterol. But the equation based on our experimental results predicts a serum-cholesterol change:

$$\Delta \text{ Chol.} = 2{\cdot}74(0\text{–}20) - 1{\cdot}31(0\text{–}20) = -29,$$

i.e., on the average, the serum-cholesterol concentration will fall by 29 mg. per 100 ml. on the second diet.

Finally, we may consider a third diet which differs from the first only in that the total fat is only 67 g. (20% of total calories). The iodine value is still 86 in both diets. Ahrens et al. apparently predict no change, or at least they provide no clue as to what may happen. But our equation predicts:

$$\Delta \text{ Chol.} = 2{\cdot}74(10\text{–}20) - 1{\cdot}31(10\text{–}20) = -14,$$

i.e., changing from the first to the third diet will, on the average, produce a fall of 14 mg. per 100 ml.

In view of the fact that the great current interest on these points seems to be matched by an equal degree of confusion in many quarters, we should point out that the prediction equation refers to the average changes in serum-cholesterol to be expected in men without a high serum-cholesterol within two to four weeks after a dietary change. Larger responses may be expected in hypercholesterolæmia and also, perhaps, with dietary differences maintained for very long periods of time. And, of course, there is no place here for speculations about "essential-fatty-acid deficiency."

ANCEL KEYS
JOSEPH T. ANDERSON
FRANCISCO GRANDE.

Laboratory of Physiological Hygiene, University of Minnesota, Minneapolis.

REDUCTION OF CIRCULATING LIPIDS

SIR,—With reference to the article by Dr. Oliver and Dr. Boyd [1] your readers may be interested to hear of our results in a similar therapeutic trial [2] with 2-phenyl-*n*-butyric acid amide.*

Of 15 men with considerable hypercholesterolæmia, 12 had had a myocardial infarction between six weeks and a year previously, but had no signs at present of cardiac failure or of angina: 1 had essential hypertension, another had essential hypercholesterolæmia without clinical manifestations, and 1 had hypercholesterolæmia with xanthoma tuberosum on the fingers and elbows. The ages of the patients varied from 36 to 63 (average 50·6).

The dosage of 2-phenyl-*n*-butyric acid amide was 1 g. every eight hours. All patients were carrying on their usual occupations; no special diet was given, but they were asked to be careful not to put on weight. 1 patient received the treatment for four weeks, 3 for two months, and the others for from three to five months. In 10 of the 15 patients, plasma-cholesterol level was reduced by 20 mg. or more per 100 ml. The initial mean total plasma-cholesterol in the 10 patients who reacted favourably was 346 mg. per 100 ml.; this dropped to 310 mg. after giving the drug. The mean initial absolute level of β-cholesterol was 310 mg. per 100 ml., dropping to 258 mg. after treatment (the β-cholesterol level was determined by analytical chemical methods after elution of the fraction from the paper after electrophoresis).

The average total plasma-cholesterol among healthy men of European Jewish origin in Israel in the age-group 40–60 is 220 mg. per 100 ml., and of β-cholesterol 180 mg.; taking these levels as 100%, our results for the 10 patients were a drop in total cholesterol from 157% to 131% and a drop in β-cholesterol from 162% to 143%.

The effect of 2-phenyl-*n*-butyric acid amide seems to be greater in patients with a high initial level of plasma cholesterol; 4 of the 5 patients who did not react to the treatment (and only 1 of the 10 who did) had an initial plasma-cholesterol less than 300 mg. per 100 ml.

Like Dr. Oliver and Dr. Boyd, we found hardly any change in the ratio between α and β cholesterol, even where there was a significant fall in total cholesterol. We have noted this in other therapeutic trials for lowering the lipid levels, and it seems that the ratio of α to β cholesterol is one of the most stable factors of the lipid patterns.

In none of the 15 patients did the lipid levels rise. We infer that 2-phenyl-*n*-butyric acid amide has a genuine, though not great, cholesterol-depressing effect. Our results are not so favourable as those of the French and Italian clinical workers,[3–6] but we believe that n-phenyl-*n*-butyric acid amide does have some effect, especially when the plasma-cholesterol is very high.

DANIEL BRUNNER
K. LOEBL.
Tel-Aviv.
Jerusalem.
L. E. SCHINDEL.

CORONARY-ARTERY DISEASE

SIR,—In your leading article of March 22 you quote the statement that "in the healthy organism fibrinolysis is in a dynamic equilibrium with the fibrin-depositing coagulation process", the implication being that so much has been established. This is rather misleading, since what is quoted is an intelligent speculation first put forward to my knowledge by Nolf in 1908, and adopted as a working hypothesis by many workers, including Astrup. However attractive the concept may seem it should be made clear that it is unsupported by direct evidence.

It will be a pity if the observations of various workers on fibrinolysis in vitro, including the effect of fat, be pressed into speculative dynamic hypotheses, subsequently to be quoted as if proven. Such a tendency is likely to retard and not to advance knowledge.

G. R. FEARNLEY.
Gloucester.

RECTAL METHYLPENTYNOL IN LABOUR

SIR,—The place of methylpentynol in labour is now well recognised, but rectal administration receives no mention. This route has been found effective in over 5000 women admitted to the Birmingham Maternity Hospital in the past three years.

This method was first tried when it was noted that the patient who most often vomited the oral capsule was the nervous primigravida—the patient whose apprehension it was hoped to relieve, not increase. Bourne [7] reported that 8% of patients vomit the capsule, but a second dose is usually retained. By use of the rectal route, increase of nervous tension from this vomiting can be avoided without loss of the drug's efficiency.

Methylpentynol is given half an hour after an enema to a patient in early established labour. The usual dose is 750 mg. (i.e., 3 capsules), inserted with the finger as far as possible beyond the anal margin. Occasionally in a very nervous primigravida 1 g. of methylpentynol is given; and, again uncommonly, the dose may be repeated in not less than three hours. When the patient's anxiety is associated with painful contractions it is our practice to give 100 mg. of pethidine hydrochloride intramuscularly with the initial dose, for methylpentynol does not relieve pain.

The drug is as efficient when given rectally as it is by mouth. The clinical impression is that labour is shortened and the incidence of postpartum hæmorrhage is not increased.

*Marketed as 'Nivonorm' by Teva, Jerusalem.

1. Oliver, M. F., Boyd, G. S. *Lancet*, 1957, ii, 829.
2. Brunner, D., Loebl, W., Schindel, L. E. (in the press).
3. Cottet, J., Vignalou, J., Redel, J., Colas-Belcour. *Bull. mem. Soc. méd. hôp. Paris.* 1953, **69**, 903.
4. Mathivat, A., Cottet, J. *ibid.* p. 1030.
5. Cottet, J., Mathivat, A., Redel, J. *Pr. méd.* 1954, **62**, 939.
6. Rossi, B., Rulli, V. *Amer. Heart J.* 1957, **53**, 277.
7. Bourne, G. *Lancet*, 1954, ii, 522.

If it is given late in the first stage, pressure of the head during the second stage will at times expel a proportion of the dissolved capsule and drug from the anus. As it is a brilliant green it is easily distinguishable from meconium.

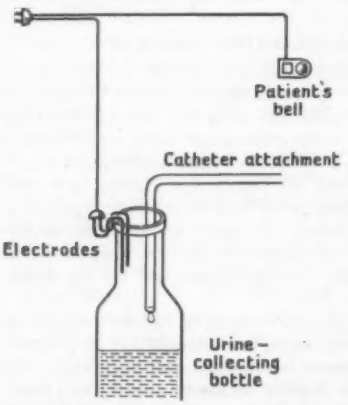
No ill effects have been seen, either generally or locally in the rectum. The infant appears unaffected.

This method has been of value in general practice, where constant supervision in the early stage of labour is not always possible.

University of Birmingham. W. L. WHITEHOUSE.

AUTOMATIC SIGNAL FOR URINE-COLLECTING BOTTLES

SIR,—It is sometimes hard for nurses, especially during busy night-watches, to cope with the rapidly filling urine-collecting bottles of polyuric patients with indwelling catheters. An automatic device for calling the nurses' attention to a full bottle would therefore be of value, and the following signal system was constructed.



Two electrodes, connected to the regular patient-bell system (working under 24 volts) are put into the upper part of the urine - collecting bottle (see accompanying figure); as soon as the urine reaches the electrodes, the electric circuit is closed (by electrolysis of the urine), and the bell rings—incessantly, of course, thereby differentiating this call from the normal one-ring call by patients.

Our nurses appreciate this device. Urine collections are now more accurate, and ward hygiene has improved.

I am grateful to Mr. J. Fraenkel, the hospital electrician, for his advice.

Shaarei Zedek General Hospital, Jerusalem. J. LEURER.

NO PEACE FOR THE PATIENT

SIR,—"Ex-Patient" (March 22) lists forty separate calls on her attention during the hospital day, but does not describe how sleep is murdered at night too. A recent extended visit to hospital (when I had every reason to be grateful for the excellent care which I received) opened my eyes, both figuratively and in fact.

The main causes of the disturbance seem to be the clanging and squeaky trolleys (which are apparently indispensable to nurses in the course of their duty), and the constant shouting of the senile and demented. Could not the hospital trolleys be oiled, and the senile all be placed together in one ward? In order to fill a ward, medical and surgical patients might have to go together, but, after all, this is supposed to be an age where barriers are breaking down.

While the vast majority of patients do not suffer physically at all under these nocturnal disturbances, the effect on children (and there is usually one in every ward in a large general hospital) must surely be bad.

The Medical School, Manchester. VALERIE FRAZER.

P.A.S. AND THE PATIENT

SIR,—We should like to join the discussion which has followed our article on outpatient P.A.S. therapy.[1–6]

Our main aim was to indicate the *size* of the problem presented by the failure of patients to consume their prescribed P.A.S. Whether the default-rate is 50% (as found by us in the 151 members of a complete outpatient population), or whether it is 25% [7] or 22% [5] (as found in more selected groups), the conclusion must be the same: patients who fail to take P.A.S. form a very substantial proportion of those so treated. We cannot believe that patients vary so much from district to district that any physician could afford to disregard this fact when deciding to use oral medication. The difficulties of providing an alternative to long-term streptomycin and isoniazid [2 5] are freely admitted, but they must be weighed carefully against the possible failure to take P.A.S. The toxic effects of streptomycin, in our experience, can partly be avoided by giving equal parts of streptomycin and dihydrostreptomycin, and this is our practice in patients over 50 years of age. If oral therapy is chosen, then every encouragement and explanation must be given to the patients, and urine tested on frequent and unexpected occasions.

Our second aim was to draw attention to a modification of the ferric-chloride test which is simple enough to use as a routine in outpatient departments and is, when performed exactly as described, sensitive enough to detect P.A.S. taken in full dosage whilst minimising confusion with the usual doses of aspirin. A test that is too sensitive would react strongly with the urine of patients who have taken aspirin or salicylate; inadequate doses of P.A.S. would also give positive results. At the same time we consider that the problem of occasional false results is of little importance compared with the default-rate revealed.

The detection of calcium B-P.A.S. in the urine is affected by the dosage schedule and dose/test time intervals as indicated by Dr. Lauener and Dr. Friedrich.[6] During the period of our trial the daily prescriptions were 14 g. of calcium B-P.A.S. or 10 g. of P.A.S. We have felt these to be the minimum desirable doses. At this dosage of calcium B-P.A.S. the proposed increase in sensitivity [6] is unnecessary and in fact undesirable: in its present form the test may well be negative if patients are taking very low doses of calcium B-P.A.S., but we feel this to be an advantage. We always prescribe oral P.A.S. in two equal daily doses at twelve-hour intervals, as you recommend,[3] and therefore our single dose of calcium B-P.A.S. was always twice that mentioned by your correspondents.[6] During our trial calcium B-P.A.S. was prescribed in 43 cases. In 21 (49%) a positive urine test was found and in 9 cases the test was still positive at ten to twelve hours after ingestion. It thus seems clear that a 7 g. dose of calcium B-P.A.S. is capable of giving a positive reaction to our ferric-chloride test, which should be of sufficient sensitivity to be of practical value to those physicians who continue to prescribe this drug. We ourselves are not convinced that calcium B-P.A.S. is as effective in preventing isoniazid resistance as is P.A.S., and for this and other reasons we no longer use it.

However, to return to the main argument, even if we assumed that all our negative tests with calcium B-P.A.S. were false (which we do not believe), the proportion of defaulters among our patients is lowered only from 50% to 36%. It is evident that all published work on this subject has revealed a high default-rate in taking P.A.S.

1. Dixon, W. M., Stradling, P., Wootton, I. D. P. *Lancet*, 1957, ii, 871.
2. *ibid.* p. 881.
3. ap. Simon, D. J. *ibid.* p. 947.
4. Edwards, J. H. *ibid.* p. 1171.
5. Leggat, P. C. *ibid.* p. 1283.
6. Lauener, H., Friedrich, T. *ibid.* March 15, 1958, p. 592
7. Simpson, J. McD. *Tubercle*, 1956, 37, 333.

Whereas, in the case of this drug, the unpleasant side-effects provide an adequate reason, we believe that the issue may be much wider. A similar picture might well be revealed in the medication for diseases other than tuberculosis.

Finally, may we express our general disapproval of eponyms? In fact I. D. P. W. was responsible for the modification of the standard ferric-chloride test, so to call it "Dixon's test" would be doubly wrong.

W. M. DIXON
PETER STRADLING
I. D. P. WOOTTON.

Hammersmith Chest Clinic, London, W.12.

A LOW-RESISTANCE RESPIRATORY VALVE

SIR,—I must take exception to the comments of Dr. Theron and his colleagues (Feb. 22) upon the low-resistance respiratory valve described by my former colleagues.[1] It seems that Dr. Theron and his colleagues have never seen such a valve, and so their comments on its suitability, however valid, are out of place. Furthermore, it is not true to say: "The only valve of comparable (sic) resistance is that described . . ."; had they plotted the published resistance of Bannister and Cormack's larger valve in their fig. 1, they would have found that it falls between the curves (5a and b) for their own doubtless excellent valve.

Oxford. D. J. C. CUNNINGHAM.

LUNG RESECTION FOR BRONCHIECTASIS

SIR,—Your annotation of March 22 is a gross misrepresentation of the present position of surgery in bronchiectasis. One has come to regard pulmonary resection for localised bronchiectasis as a most rewarding adjunct to treatment in a substantial proportion of cases, and it comes as a rude shock to see you dismiss it as "rarely desirable".

You base your opinion on the grounds of (1) high operative mortality, prohibitive in the case of pneumonectomy, (2) high incidence of morbidity, in particular postoperative collapse, (3) loss of pulmonary function, and (4) extension of bronchiectasis in the residual lung. You further state that the results of conservative treatment are favourable.

In a personal series of 109 cases, including 17 bilateral cases and 6 pneumonectomies, there were no operative or postoperative deaths. One patient died a year after extensive bilateral surgery from pneumonia and respiratory failure. About half of the patients were under 20, and all were operated on because of failure of medical treatment. There was no case of persistent postoperative atelectasis. Only patients who were not symptom-free for a year after surgery were followed up for longer periods; the great majority of patients have been discharged. Of the remainder, in no case has further bronchiectasis been shown to develop.

Gross localised bronchiectasis (which may include as much as both lower lobes, middle lobe, and lingula) is surely accompanied by loss of function in the diseased areas, and its removal results in little or no further loss of function. Pulmonary efficiency may be improved.

Finally, you state that no modern advance in technique is likely to affect the most important factor in the alleged failure of surgery—namely, the inevitable distortion of the bronchial tree and interference with the drainage of the remaining bronchi. I am aware of no evidence to show that bronchial distortion, if it occurs, is a cause either of bronchiectasis or of impaired bronchial drainage.

I submit, Sir, that the figures I have outlined are more in keeping with the experience of a modern chest service than those you quote, and which you admit are unusual in the very high average age of the patients reviewed. It would be a disservice to patients suitable for surgery if they were instead to be condemned to a life of recurrent exacerbations and increasing respiratory disability.

Dublin. K. M. SHAW.

CLINICAL GERIATRICS

SIR,—Dr. Pappworth (March 22) asks in effect whether the clinical signs of any disease differ in elderly as compared with younger patients. The answer is, oddly enough, that very often they do, though the differences are greater in those in their 70s and above. To mention but a few: elderly people with pneumonia seldom exhibit any pyrexia, cardiac infarction is common yet frequently "silent", and many disorders come to notice only because of mental symptoms which are, however, not evidence of senile dementia. It is important both that the many differences should be recognised, and that the limits of normality at various ages should be better understood.

But geriatrics is also concerned with the many ways in which elderly and partially disabled old people can be rehabilitated and helped afterwards to live an independent existence outside hospital. Those who have not seen it taking place can scarcely believe that nearly half of those admitted to an active geriatric department can be made well enough to leave hospital. This is achieved not by administration, but by hard work in the clinical field. Should not geriatrics therefore be taught as a branch of medicine by those who practise it, so that we may at last be rid of the attitude of mind which classes patients over 70 as "senile" and thus unworthy of our clinical attentions?

Ipswich. JOHN AGATE.

SIR,—Dr. Pappworth does not seem to have read your annotation of March 1, which mentions several ways in which the symptoms and signs of disease may be altered by age. If he consults the current issue of *The Practitioner* he can read a short paper describing a series of gastric ulcers, proved at necropsy, but not presenting normal clinical features in old people. The same journal [1] also records a group of patients with new growths whose signs and symptoms were cloaked by mental symptoms. The special effects of hæmorrhage in the elderly have been described by Bedford [2]; the organic basis of confusional states in the elderly by Flint [3]; hypoglycæmia and confusion by Helps [4]; and Vines [5] has written on clinical pitfalls in the elderly and so have others elsewhere.

Dr. Pappworth mentions an age of 68 for a hypothetical patient. This is rather on the young side for a typical geriatric case. A survey at Queen's Hospital, Croydon, showed that 34% of the patients were between 80 and 89, while 9% were over 90. The administrative problems, which Dr. Pappworth says he can understand, arise because the clinical aspects of disease change as the patient grows older. For necropsy proof of this I would refer him to a series of papers in *Geriatrics*.[6]

Clinical instruction in geriatrics is also desirable because the limits of normality change with age. My own book on *Old Age* was one of the first to give detailed examples of this. Hobson

1. Bannister, R. G., Cormack, R. S. *J. Physiol.* 1954, **124**, 4 P.

1. *Practitioner*, 1957, **178**, 233.
2. *Lancet*, 1956, ii, 750.
3. *Brit. med. J.* 1956, ii, 1537.
4. *Lancet*, 1957, i, 138.
5. *ibid.* 1955, ii, 103.
6. *Geriatrics*, 1949, **4**, 281; *ibid.* 1950, **5**, 90; *ibid.* 1951, **6**, 85; *ibid.* 1952, **7**, 137; *ibid.* 1953, **8**, 215, 267.

and Pemberton have also provided data in *The Health of the Elderly at Home.*

In fact, there is now recorded a considerable body of material dealing with clinical and pathological aspects of disease in old age, which should be brought to the notice of students—the more so since some of their seniors are not familiar with it.

London, S.W.16. TREVOR H. HOWELL.

5-BROMOSALICYLHYDROXAMIC ACID FOR TUBERCULOSIS

SIR,—The tuberculostatic action of 5-bromosalicylhydroxamic acid was described by Urbanski and his colleagues.[1] More recently Hornung et al.[2] have reported that the compound, in a daily dose of 3 g., is as effective as 10 g. of *p*-aminosalicylic acid (P.A.S.) in delaying the development of resistance to isoniazid in patients suffering from tuberculosis. They also stated that 5-bromosalicylhydroxamic acid was much better tolerated than P.A.S. It seemed, therefore, that it would be interesting to investigate these claims, and the results of some preliminary experiments may be summarised.

In vitro we have confirmed the observations by McIsaac and Williams [3] that high concentrations (of the order of 50 μg. per ml.) were required to inhibit the growth of *Mycobacterium tuberculosis*. On the other hand in vivo, by the mouse corneal method [4] the drug was found to possess some retarding effect on the development of lesions, the order of effectiveness being that of P.A.S. There was no effect on a P.A.S.-resistant strain.

Since it is very important to try to find a more palatable substitute for P.A.S. further experimental work is in progress and the question of a clinical trial is under consideration.

J. M. ROBSON
R. KNOX.
Guy's Hospital, London, S.E.1.
Brompton Hospital, London, S.W.3.
R. W. RIDDELL.
E. M. BAVIN.
Smith & Nephew Research Ltd.

FULMINATING BERIBERI

SIR,—Dr. Baron and Mr. Oliver write (Feb. 15): "admittedly aneurine alone can be successful . . . but deficiency of one vitamin alone is rare". I submit that deficiency of aneurine alone, or rather the need in some individuals for large daily doses of aneurine, is less rare than is generally believed. Some authorities state that, except in the initial treatment of acute cardiac beriberi, there is no justification for the administration of single doses in excess of 10 mg.[5 6]

There are reports of isolated instances of the successful use of aneurine in such varying conditions as herpes zoster,[7] varicose ulcers,[8] vesicular atony,[9] and, for its analgesic effect, in the first and second stages of labour.[10] I suggest that, if larger doses of aneurine had been used in the past, many more reports of its efficacy in a variety of conditions could have appeared.

Three cases are known to me which indicate, not so much a deficiency of the vitamin, as a need for additional daily intake of relatively large amounts.

A white man, aged 42, otherwise healthy, had had recurrent attacks of herpes simplex since childhood; these were at times debilitating. In 1948 he was given aneurine hydrochloride 200 mg. daily by mouth; since that time, except for short periods when the medication was neglected, he has had no recurrences of herpes simplex.

A white woman, aged 40, had for several years been taking daily doses of up to gr. 15 of cascara sagrada for constipation. In 1954 she was given aneurine hydrochloride, and since that time has been taking daily oral doses of 200–400 mg., with complete relief from all symptoms of constipation.

A white girl, aged 14, had had nocturnal enuresis since infancy. She had been examined, at different times, by a general practitioner, a pædiatrician, a urologist, and a psychiatrist; in each case except for the nocturnal enuresis the child appeared to be normal and healthy. No cause could be found for the condition and no medication helped until, in November, 1957, she started taking aneurine hydrochloride. Initially she was given 25 mg. daily by mouth with partial success; the dose was increased to 400 mg. daily by Dec. 7, 1957, and maintained at that level since. The nocturnal enuresis ceased on Dec. 8, and has recurred only once since, when the aneurine was omitted.

There is, I submit, often a case for giving aneurine, providing the dosage is high enough. Most of the difficulties reported with administration of aneurine, and there have been several,[6 11] have been during parenteral use; I have not come across a single adverse reaction to oral administration.

A thorough study of the need for aneurine in man and its utilisation could be most rewarding.

Saint John, New Brunswick. JOHN E. WASSON.

THE LAW AND STERILISATION

SIR,—Your review (March 22) of my book, *The Sanctity of Life and the Criminal Law*, leaves room for misunderstanding which I should be glad of the opportunity to remove. You say: "Dr. Williams' apparent advocacy of compulsory sterilisation might be harmfully taken much further by others than he himself intended." In fact I am not in favour of compulsory sterilisation. I merely urged the implementation of the Brock report, which was concerned with voluntary sterilisation.

My discussion of the committee's report proceeded as follows (p. 108):

"The committee, which gave attention to this problem of consent, expressed itself as convinced that when the higher-grade defectives ask for sterilisation, perhaps to assist themselves in obtaining a discharge, or in some cases to be allowed to marry, they understand what they ask for. 'The essence of a voluntary system,' said the committee, 'is that those who object should be free to do so. What matters is that there should be no compulsion. So long as there is no unfair pressure and no patient is forced or bribed to consent, it seems to us mere casuistry to discuss how far the patient full appreciates all the implications of consent.'"

The terrible abuses of the Nazis did great harm to the cause of eugenics, but in my study of the working of the American sterilisation laws I think I showed that their results gave ground for confidence. To quote my own words again:

"The American experience is of great interest because it shows how remote from reality in a democratic community is the fear—frequently voiced by Americans themselves—that voluntary sterilization may be the 'thin end of the wedge', leading to a large-scale violation of human rights as happened in Nazi Germany. In fact, the American experience is the precise opposite—starting with compulsory sterilization, administrative practice has come to put the operation on a voluntary footing."

And again: "No one with experience of sterilisation laws now advocates a compulsory system."

Trumpington, Cambs. GLANVILLE WILLIAMS.

1. Urbanski, T., Hornung, S., Slopek, S., Venulet, J. *Nature, Lond.* 1952, **170**, 753.
2. Hornung, S., Amazowicz, F., Broda, Z., Necius-Szczerbinski, Z Paryski, B., Poloncyzyk, M., Raff, T. *Brit. J. Tuberc.* 1958, **52**, 19.
3. McIsaac, W. M., Williams, R. T. *Biochem. J.* 1957, **66**, 369.
4. Rees, R. J. W., Robson, J. M. *Brit. J. Pharmacol.* 1950, **5**, 77.
5. British Pharmaceutical Codex; p. 50. London, 1954.
6. Martindale, W. The Extra Pharmacopœia; vol. I, p.175. London, 1952.
7. Waldman, S., Pelner, L. *Amer. Prof. Pharm.* 1948, **14**, 1134.
8. Oschner, A., Smith, M. C. *J. Amer. med. Ass.* 1940, **114**, 947.
9. Roome, N. W. *Canad. med. Ass. J.* 1946, **54**, 151.
10. Dubiau, J. H., et al. *Abstr. World Surg.* 1948, **4**, 46. Quoted by Martindale W. The Extra Pharmacopœia; vol. I, p. 177. London, 1952.
11. Leitner, Z. A. *Lancet*, 1943, ii, 474.

MEDICAL SUPERVISION IN TREATMENT OF OBESITY

SIR,—Obesity is now one of the leading causes of death and disability,[1] and its cost to the nation is incalculable. Yet it has been proved beyond doubt that sufficient reduction of calorie intake will produce loss of weight in every case.

A survey of 500 consecutive patients seen in the medical outpatient department at St. James' Hospital, Balham, showed that about a third had conditions either produced or exacerbated by obesity—defined as a weight more than 20% above normal weight for height and age according to the standard tables of Kemsley.[2]

Before July, 1956, some of these patients were given dietetic instruction and referred back to their own doctors; others, usually those with more serious medical conditions, were treated for a time in the outpatient department, often seeing a different doctor each time, and when weight-loss seemed satisfactory, they were discharged with instructions to continue on their own.

A follow-up of 133 of these patients after at least six months showed that weight-loss had been satisfactory (i.e., more than 30% of excess weight had been lost) in only 6%. 63% had failed to lose more than 7 lb., and 26% had actually gained weight.

During the past eighteen months an attempt has been made to treat obesity more vigorously. No patient has been discharged until the weight has been normal for at least six months. I saw all the patients myself, most of them at every attendance; time has been spent in discovering the background of each patient's obesity and the special difficulties in treating it.

Treatment was dietary whenever possible, with the object of re-educating the patient's appetite rather than achieving a rapid weight-loss. The principles of low-carbohydrate diet were explained. Drugs, including dexamphetamine sulphate, 'Preludin', 'Drinamyl', and thyroid extract were used when they were considered necessary. Patients were seen initially at intervals of two, three, or four weeks, and when weight-loss was satisfactory the intervals between appointments were gradually extended to three or six months.

SUCCESS IN THE TREATMENT OF OBESITY

—	Old methods (133 patients)	New methods* (120 patients)
Satisfactory weight-loss (more than 30% of excess weight lost)	6%	67%
Slight weight-loss (more than 7 lb. but less than 30% excess weight)	31%	27%
Unsatisfactory weight-loss (less than 7 lb. or gain in weight)	63%	6%
Reached and maintained normal weight	4%	25%*
Gained weight during treatment	26%	1·7%

* Ultimate figures will probably be higher since most of these patients are still under treatment.

Of 120 patients who have attended for more than three months, 67% have achieved satisfactory weight-loss and 25% have already reached and maintained normal weight. Only 6% have failed to lose at least 7 lb., and of these 1·7% have gained weight. Results in the previous "failures" were as good as in the new cases.

The results in the two groups are compared in the accompanying table, and indicate that the treatment of obesity without strict medical supervision is unsatisfactory, whereas close medical supervision results in successful weight-loss in a high proportion of cases.

The improvement in health in these patients, many of whom have been semi-invalids for years, is enormous. Many have previously cost the hospital many hundreds of pounds, but their health is now so much improved that they no longer require frequent attendances and investigations in various departments of the hospital. It seems likely that if every obese patient seen either in hospital or in general practice was treated along these simple lines, the health of the nation would be improved and the cost of the National Health Service reduced.

I thank Dr. Alexander Kahan, consultant physician at St. James' Hospital, Balham, for permission to study his patients, and for his helpful advice and criticism.

St. James' Hospital,
London, S.W.12. A. G. MULLINS.

1. Marks, H. H. *Hum. Biol.* 1956, **28**, 217.
2. Kemsley, W. F. F. *Ann. Eugen.* 1952, **16**, 316.

ALLERGY TO COW'S MILK

SIR,—As the leaders commercially of the present trend towards evaporated milk as a standard infant food in Great Britain, we must comment on the final paragraph of your annotation of Feb. 8 in which you suggest that the dried milks used in this country are less liable than evaporated milk to give rise to allergy.

While we assess—from constant contact with doctors—that milk allergy is fairly frequent, we have on record, from the same group of professional contacts, an extremely dramatic improvement in, particularly, eczematous conditions when the children were changed from dried-milk foods to evaporated milk.

This is supported by Sturrock [1] in a study of four groups of infants fed on breast milk (control), cow's milk, dried milk, and evaporated milk. Breast milk and evaporated milk showed up to advantage: 60% in both these groups had a clear skin at each of the six weekly observations made. Cow's milk and National dried milk showed up unfavourably on the whole and, from clinical experience generally, it was not surprising to find the relatively high incidence of urticaria in babies taking these milks.

Ratner and Gruehl [2] said that evaporated, freshly boiled, and acidified evaporated milk, fed by mouth, was notably less sensitising. They also refer to feeding experiments with various forms of milk undertaken to determine whether there was a further diminution of sensitisation when heated milks were fed. Raw skimmed milk, 'Smaco' 303 (special hypoallergenic preparation), and dried milks sensitised more than 50% of the animals, while milk freshly boiled for four hours was much less liable to produce sensitisation, and so was evaporated milk.

Ratner [3] had this to say of dried milks:

"The antigenic changes that result from various drying processes applied to milks were studied, and it was found that the rapid drying—which is almost instantaneous—did not influence or diminish the antigenic powers of the milk proteins."

We believe that the production of special hypoallergenic milk powders both in this country and the United States indicates the awareness of dried-milk manufacturers that normal milk products have shortcomings for some milk-sensitive infants.

Evaporated milks, under exhaustive research in the United States, have clear hypoallergenic advantage over other cow's milk preparations (including dried milks), with the possible exception of fresh cow's milk boiled for four hours.

We note with interest your reference to the desirability of a British study of the incidence of milk-protein allergy, and we hope that such research will in fact be undertaken.

General Milk Products Ltd.,
London, W.C.2. R. H. WOODCOCK
Manager, Medical Department.

1. Sturrock, M. *Med. Offr.* 1952, **87**, 143.
2. Ratner, B., Gruehl, H. L. *Amer. J. Dis. Child.* 1935, **49**, 287.
3. Ratner, B. *J. Amer. med. Ass.* 1935, **105**, 934.

Obituary

ALEXANDER JAMES HUTCHISON RUSSELL

Kt., C.B.E., M.A., M.D., LL.D. St. And., D.T.M., D.P.H.

Sir Alexander Russell, whose death on March 22 we announced last week, had a distinguished career in India, where he was public health commissioner from 1933 until he entered his busy retirement in 1939.

He was born in 1882, the son of Walter Nicoll Russell, a schoolmaster in Glen Devon, and he was educated at Dollar Academy and the University of St. Andrews, where he graduated M.B. in 1906. The following year he joined the Indian Medical Service. After a period of military duty he was appointed for civil employment to the Madras Presidency and in 1913 he became medical officer of health of Madras city. Before long he realised that his chief interest lay in preventive medicine, and in 1914 he was appointed professor of hygiene and bacteriology at Madras Medical College. After five years he turned to pathology and he held that chair for several years.

In 1921 Russell re-entered the public service as provincial director of public health. He was selected as medical assessor to the Royal Commission on Labour in India, which was set up in 1930, and in 1931 he was a delegate to the Office International d'Hygiène in Paris. While he was in Madras he reorganised the public-health department and trained a body of keen and devoted young medical officers, inspiring them with his own high ideals of service. With his appointment in 1933 as deputy director-general of the I.M.S. Russell reached the most exacting phase of his career. In the same year he was made public health commissioner with the Government of India, and held this post till 1939. His reports were first-rate examples of his power of shrewd analysis and terse, vigorous expression, and his editions of *McNally's Sanitary Handbook of India* (1916 and 1923) were widely read.

Of Russell's work in India E. W. C. B. writes:

Long before he became public health commissioner he had shown, during his career in Madras, high administrative ability, and though he succeeded to the appointment during a period of financial stringency his drive and enthusiasm overcame many difficulties. As in Madras his tenure was one of steady progress towards the building up of a sound public-health conscience in the Government of India. He was an expert in statistics, having held a fellowship under the Rockefeller Foundation and studied the subject in the United States. As a man Russell was a sturdy, lovable Scot, intensely loyal to all his officers, and to his chiefs in the Medical Service. At headquarters in Delhi and Simla his administrative qualities found full scope and his opinion, never intolerant, was invaluable. India owes a great debt to Russell and the I.M.S. salutes one of their worthiest officers.

Soon after Russell returned to this country in 1939 war broke out. He began his nominal retirement by helping the group officer of the Emergency Medical Service at Oxford, and during the winter of 1939–40 he lectured on hygiene to the senior medical students. In June, 1940, he joined the Department of Health for Scotland as a temporary medical officer and a few months later was appointed to the temporary post of deputy chief medical officer in the same department, with special charge of the national campaign against diphtheria; and he held this post till 1945. During 1944 his services were asked for by the Colonial Office as chairman of a committee to report on the medical and health services of Trinidad and Tobago, and in 1945 he visited Austria as a member of a medical mission on epidemic control.

J. M. M. writes:

In this active third phase of his career he added distinction to his wide reputation, by devoted and unselfish service. He was admired and loved for his delightful personality; he brightened all social relationships with his pawky humour, and shared in all the activities of his colleagues. He had been in his regimental polo team in the early days, and in his later years he played a steady game of golf and was a member of the Royal and Ancient. Even in his final retirement at Bridge-of-Allan he took his place on many local committees, while he and his wife gave hospitality in generous measure. It was a happy time so close to the hills that watch over Glen Devon.

RALPH EWART JONES

B.Sc. Birm., M.R.C.S., D.P.H.

Dr. Ewart Jones, director of the regional public health laboratory at Coventry, died on Feb. 8 at the age of 53.

He was born at Sutton Coldfield and educated in Birmingham at King Edward's School and at the medical school. After qualifying in 1927 he held a house-appointment at Hallam Hospital, West Bromwich, and was assistant clinical pathologist at Birmingham General Hospital before he became assistant to Prof. J. F. D. Shrewsbury in the department of bacteriology of Birmingham University. Later he was appointed senior lecturer in the department. During the late war he was seconded to the Emergency Public Health Laboratory Service under the Medical Research Council, and he was in charge of a laboratory at Wrekin College, Wellington, which was ultimately transferred to Hereford. In 1948 he was appointed to his present post and for the past two years he had also been honorary lecturer in bacteriology in the University of Birmingham. He leaves a widow.

P. M. P. writes:

I became Ewart Jones' assistant at a time when he had every appearance of robust health, and came to value him highly as a director, a bacteriologist, and a friend. He was conscientious and painstaking, a man of charming personality who gave and expected the best at all times. The welcome he gave in his home was without reservation, and behind his urbanity was always a quiet humour which was a delight to those who knew him. That he possessed the sterner qualities of supreme courage and impassive fortitude became evident when illness overcame him, for his demeanour remained calm and unflinching, and he did not alter his way of life.

Parliament

Consultants

Mr. KENNETH ROBINSON asked the Minister of Health the number of consultants, excluding psychiatrists, in the employ of each regional board and the number of staffed beds, excluding mental and mental-deficiency beds, in and the population served by each region.—Mr. DEREK WALKER-SMITH replied: The information is as follows:

Regional hospital board	Number of consultants, whole-time and part-time (excluding psychiatrists) at 31.12.56	Number of staffed beds (excluding beds allocated to mental illness and mental deficiency) at 31.12.56	Estimated population of region in thousands at 30.6.56
Newcastle ..	353	15,338	2944
Leeds	299	17,753	3066
Sheffield	357	19,716	4230
East Anglian ..	167	7254	1485
N.W. Metropolitan	642	17,930	3942
N.E. Metropolitan	531	18,966	3103
S.E. Metropolitan	556	19,933	3229
S.W. Metropolitan	703	25,216	4707
Oxford	188	7433	1503
S. Western ..	330	16,621	2792
Welsh	293	15,494	2608
Birmingham ..	491	23,047	4547
Manchester ..	409	23,611	4381
Liverpool	276	14,180	2130
Total	5595	242,492	44,667

Notes and News

ANOTHER "UNIVERSAL DIAGNOSTIC TEST"?

LAST month there was quite a flutter in some American newspapers about the announcement of a "new test for the early diagnosis of disease". "Blood Cell Study Seen Quick Way to Diagnose All Disease. Medical Break-Through?" was the headline in the *Baltimore News-Post* for March 19. Prof. Winston H. Price, of Johns Hopkins University School of Public Health, who is in charge of the team working on these tests, and had described his work at a closed meeting, refused to be drawn by reporters; but on March 23 the *New York Times* gave a sober and informative account of this work.

Apparently Dr. Price and his colleagues have been working on the serum-mucoproteins. These substances have been studied for many years; as long ago as 1940 Rimington described their characteristic properties [1]; and ten years ago Winzler et al.[2] showed that the serum-mucoprotein was a mixture of three components. It has long been known that the serum-mucoproteins are increased in rheumatoid arthritis and in other diseases too; thus Kelley et al.,[3] for example, found that results from estimating the serum-mucoproteins roughly paralleled changes in the erythrocyte-sedimentation rate, except that in chronic heart-disease the mucoprotein estimation was the more reliable. The changes in serum-mucoproteins have been accepted as one of the non-specific manifestations of diseases involving tissue destruction—like the erythrocyte-sedimentation rate and C-reactive protein. What Dr. Price and his colleagues are reported to have found is that the relation to each other of the three serum-mucoprotein components differs in different diseases, and that completely abnormal mucoproteins appear in some conditions. Thus, according to the *New York Times* report, in nephrosis and nephritis only one of the three normal mucoproteins was present, the other two being missing altogether; and in mental diseases all the serum-mucoproteins were abnormal. In cancer at four sites—prostate, kidney, gastrointestinal tract, and lung—four abnormal mucoproteins were present; the proportions of these four abnormal components was the same for tumours at the first three sites but differed for "lung" cancer. In acute diseases, such as rheumatic fever, the serum-mucoprotein values were high and remained raised after clinical recovery.

An announcement from Johns Hopkins, quoted by the *New York Times*, is properly cautious: "It cannot be too strongly emphasized", it states, "that the number of cases in each disease that have been analyzed is small, and that much more data will have to be accumulated before the true significance of these patterns (of the blood-serum fraction) can be determined." But it seems from this report that Prof. Winston Price has extended the study of serum-mucoproteins to a point where he hopes that the results will give more specific information than has previously been obtainable from tests of this type. All physicians are familiar with the patient who has vague symptoms and is found to have a raised erythrocyte-sedimentation rate; such a finding inevitably leads to further and often fruitless blood-counts, X-rays, and studies of blood chemistry. The serum-mucoprotein fractionation may indicate more specifically where to look, and whether to seek infection or malignancy. From the preliminary results quoted, the pointer to the site of a lesion is hardly specific; but the indication about the type of lesion may be more reliable. Work on the early detection of malignancy by studying changes in serum-proteins has been going on for a long time. Perhaps the Johns Hopkins group have really made the method work. There is no denying that such a test would be very useful.

1. Rimington, C. *Biochem. J.* 1940, **34**, 931.
2. Winzler, R. J., Devor, A. W., Mell, J. W., Smyth, I. M. *J. clin. Invest.* 1948, **27**, 609.
3. Kelly, V. C., Adams, F. H., Good, R. A. *Pediatrics*, 1953, **12**, 607.

INTERNATIONAL CHILDREN'S CENTRE

AT the opening ceremony in 1950, Prof. Robert Debré said: "Conceived as an institution for information, instruction, mutual aid and cooperation, the International Children's Centre hopes to contribute to better conditions for all the children of the world." Last year the activities of the centre included two seminars (on primary tuberculosis and pertussis); research on tuberculosis vaccination, the prevention of rheumatic fever, and the growth and development of children; and eight courses of instruction on such topics as reablement of crippled children, school health, child welfare (including a five-month course for African midwives at Dakar), and the care of premature infants. This and other work is set out in the annual report.[1]

HEALTH SERVICES FOR THE ARAB REFUGEES

ONE of the most tragic results of the 1948 war in Palestine has been the plight of the several hundred thousand Arabs who then left their homes to take refuge in neighbouring Jordan, Lebanon, Syria, and the Gaza Strip. Today most of these people still live in the same places where in 1948 they arrived hungry and destitute awaiting relief from the local Arab Governments.

As the weeks following their exodus stretched into months, and they found that they could not return to their homes, it became apparent that more organised relief was essential if a major catastrophe was to be avoided. The risk of epidemics was already serious when in 1949 the United Nations Relief for Palestine Refugees was set up to carry out relief with the aid of the international committee of the Red Cross, the League of the Red Cross Societies, and the American Friends Service Committee.

The small health teams which were organised a decade ago by a W.H.O. specialist to meet the emergency have since developed into an efficient health force serving nearly a million refugees now living in camps, towns, and villages scattered over 100,000 square miles in four different countries. The United Nations Relief and Works Agency which took over relief activities in 1950 is now spending at the rate of $5 million a year on its health programme alone. Its 3500 employees include 120 doctors and dentists and over 450 nurses, nursing auxiliaries, and midwives. Its technical direction is the responsibility of the World Health Organisation. There are 92 clinics (attracting 6 million visits a year) and 2000 hospital beds in U.N.R.W.A. and other hospitals, but preventive work is given priority: it includes attention to water-supplies and disposal of sewage and waste; an anti-malaria campaign (with swamp drainage and insecticide spraying), which has led to a fall in the proportion of malaria patients seen in the clinics in East Jordan from 18·5% in 1953 to 0·66% last December; mass inoculations (including, last year, 254,000 against typhoid and 497,000 against smallpox); supplementary feeding of the sick, of pregnant and nursing women, and of children; and health education, particularly in hygiene and child care. At the maternal health centres, besides receiving such instruction, pregnant women (100,000 consultations last year) are cared for, including tests—and, where necessary, treatment—for syphilis, the provision of a simple layette, and supervision of the infants up to the age of two years.

By these means serious epidemics have been avoided, and in some ways, the health of the refugees has been improved; but their housing is far from satisfactory and their rations are the minimum needed for subsistence. The work of the health programme must continue; and so must the contributions of Governments to the funds of the agency.

BETHLEM AND MAUDSLEY HOSPITAL REPORT

IN his article of March 15 (p. 578) Dr. C. P. Blacker referred to the triennial statistical report of the Bethlem Royal Hospital and the Maudsley Hospital for the years 1952–54, which he has edited. The report has now been published (pp. 152; 10*s.* 6*d.*).

1. Berthet, E. Report for 1957 of the International Children's Centre Château de Longchamp, Paris, 16e.

CORTICOTROPHIN—A CORRECTION

LAST week we said that corticotrophin preparations may now be prescribed on form F.C.10. This is not so.

LESS DIAMORPHINE USED

SOME time ago the Economic and Social Council of the United Nations expressed the hope that diamorphine (heroin) would no longer be used.[1] In its eighth report [2] the W.H.O. Expert Committee on Addiction-producing Drugs notes "that the relatively small residuum of licit use of diacetylmorphine was tending to be further reduced." The committee believes that this substance "can be replaced by more than one drug with less risk to public health."

University of Dublin

On Thursday, May 1, at 5 P.M., at Trinity College, Dublin, Prof. A. Hagedoorn, of Amsterdam, will give the Montgomery lecture on the gross and minute defects of the germ cells and clinical ophthalmology.

Royal College of Physicians of London

On Tuesday and Thursday, April 15 and 17, Dr. J. St. C. Elkington will give the Lumleian lectures on cerebral vascular disease in the light of modern techniques.

On Tuesday and Thursday, May 13 and 15, Dr. Paul Wood will give the Croonian lectures. His subject will be the Eisenmenger syndrome, or pulmonary hypertension with reversed central shunt. All the lectures will be given at the college, Pall Mall East, S.W.1, at 5 P.M.

St. George's Hospital Medical School, London

Postgraduate demonstrations in psychiatry will be held at the School, Hyde Park Corner, S.W.1, on alternate Thursdays at 5 P.M. They are open without fee to doctors and senior medical students. The first will be given by Sir Paul Mallinson on April 17.

West London Medico-Chirurgical Society

On Wednesday, April 16, at 8.30 P.M. at the house of the Royal Society of Arts, John Adam Street, W.C.2, Sir Gordon Gordon-Taylor will give the Cavendish lecture. His subject will be On Tradition.

Nutrition and Climatic Stress

The Scottish group of the Nutrition Society is holding a symposium on this subject at the Hannah Dairy Research Institute, Kirkhill, Ayr, on Saturday, April 26. Papers will be read on human and animal nutrition. Further particulars may be had from Dr. J. Davidson, The Rowett Research Institute, Bucksburn, Aberdeenshire.

International Congress for Manipulative Therapy

This congress will be held in Baden, Switzerland, from May 1 to 4. The speakers will include Dr. J. H. Cyriax and Dr. Alan Stoddard. Further particulars may be had from the president, Dr. J. C. Terrier, Badstrasse 64, Baden, Switzerland.

N.H.S. Award

The Industrial Court has awarded a 4½% pay increase to more than 1100 technical staff in the National Health Service. The staff who will receive the increase will include medical photographers, dark-room technicians, and physics technicians. They received their last increase in August and September, 1956. The new rates will be paid from the beginning of March.

Laboratory Animals Centre

This centre is holding a symposium on Monday, May 5, at 9.30 A.M., at 1, Wimpole Street, London, W.1, on the organisation and administration of an animal division. Further particulars may be had from the Laboratory Animals Bureau at the centre's new address at the M.R.C. Laboratories, Woodmansterne Road, Carshalton, Surrey.

1. *Lancet*, 1955, i, 1311.
2. *Wld Hlth Org. tech. Rep. Ser.* 1958, no. 142. Pp. 12. 1*s.* 9*d.* Obtainable from H.M. Stationery Office, P.O. Box 569, London, S.E.1.

The high sheriff of Carnarvonshire for 1958-59 is Prof. R. H. Parry, formerly principal medical officer to Bristol City Council.

Dr. George E. Wakerlin has been appointed medical director of the American Heart Association, in succession to Dr. Eugene B. Ferris, who died last September. Dr. Wakerlin, formerly professor of physiology and pharmacology at the University of Illinois, took up his duties on April 1.

Dr. Richard Emanuel is to be one of the recipients of an award made by the American Society for Clinical Investigation for work carried out at Vanderbilt University, Nashville, on indicator dilution methods for describing circulatory systems. He was given a year's leave from the National Heart Hospital, London, to take part in this investigation.

The United Hospitals' Choir is to give a performance of *Belshazzar* by Handel at 7.30 P.M. on Tuesday, April 22, at St. James's and St. Peter's Church, Piccadilly, London, W.1. Admission will be by programme (3*s.* 6*d.*, 5*s.*, and 7*s.* 6*d.*), which may be had from Miss J. Magrath, 18, West Side, Clapham Common, S.W.4.

The photographic department of St. Mary's Hospital Medical School, London, W.2, has made 15 films, which may be borrowed free (except for a few shillings for postage and packing) for medical audiences (including nurses) or scientific film societies. All are 16 mm. A catalogue may be had from the department.

The Directory of Child Guidance Services in England and England and Wales, published by the National Association for Mental Health, lists alphabetically under counties the child-guidance clinics and gives for each the address, names of staff, and days of attendance. Copies (5*s.*) may be had from the Association, 39, Queen Anne Street, London, W.1.

To any doctor who writes for it the National Marriage Guidance Council will send a free copy of *Sex in Marriage*, to which we referred on March 1 (p. 487). Requests should go to Mrs. Angela Reed, publications officer, National Marriage Guidance Council, 78, Duke Street, London, W.1, who will also supply order forms which can be given to patients wishing to order their own copies direct from the Council.

Diary of the Week

APRIL 6 TO 12

Tuesday, 8th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5.15 P.M. Mr. E. G. Muir: Carcinoma of the Rectum and Anterior Resection.
6.30 P.M. Mr. T. Holmes Sellors: Diagnosis and Treatment of Atrial and Septal Defects.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Psychiatry.* Dr. Bernard Zeitlyn: Postoperative Psychoses.

Wednesday, 9th

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5.15 P.M. Mr. F. W. Holdsworth: Traumatic Paraplegia.
6.30 P.M. Dr. R. A. Shooter: Spread of Infection in Hospitals.

ROYAL SOCIETY OF MEDICINE
4.30 P.M. *Physical Medicine:* Dr. C. D. Calnan, Dr. Stephen Mattingly, Dr. Verna Wright: Psoriasis and Arthritis.

Thursday, 10th

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5.15 P.M. Mr. D. N. Ross: Hypothermia as an Aid to Surgery.
6.30 P.M. Mr. Rainsford Mowlem: Treatment of Lymphœdema.

Friday, 11th

ROYAL SOCIETY OF MEDICINE
5.30 P.M. *Anæsthetics.* Dr. George Edwards: John Snow's London Associations. Dr. M. H. Armstrong Davison: John Snow and the Enlightenment.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
3.30 P.M. Mr. C. Gill-Carey: Earache—the Differential Diagnosis.

Appointments

BRODIE, JAMES, M.D. St. And., D.P.H.: consultant bacteriologist to take charge of the laboratory, City Hospital, Aberdeen.

FOSTER, D. W., M.B., B.SC. Wales, D.P.H.: M.O., Pontypridd, Glamorgan.

KINGSLEY PILLERS, ELIZABETH M., M.D. Cantab., D.M.R.: assistant radiotherapist, Addenbrooke's Hospital, Cambridge.

O'HARE, BERNARD, M.B. N.U.I., D.M.R.D.: consultant radiologist, Derby no. 1 H.M.C. and Burton-on-Trent H.M.C.

PETRIE, W. O., M.B.E., M.B. Edin., D.P.H., D.T.M. & H.: assistant M.O.H., Berwickshire.

SEFTON, ELIZABETH M., M.R.C.S., D.C.H., D.P.H.: senior M.O. (maternal and child welfare), Gloucestershire.

WRIGHT, E. W., M.B. Edin., D.P.H.: deputy M.O.H. and deputy principal school M.O., Bournemouth.

YARWOOD, G. R., M.B. Birm., F.R.C.S.: consultant surgeon, Birmingham (Dudley Road) H.M.C.

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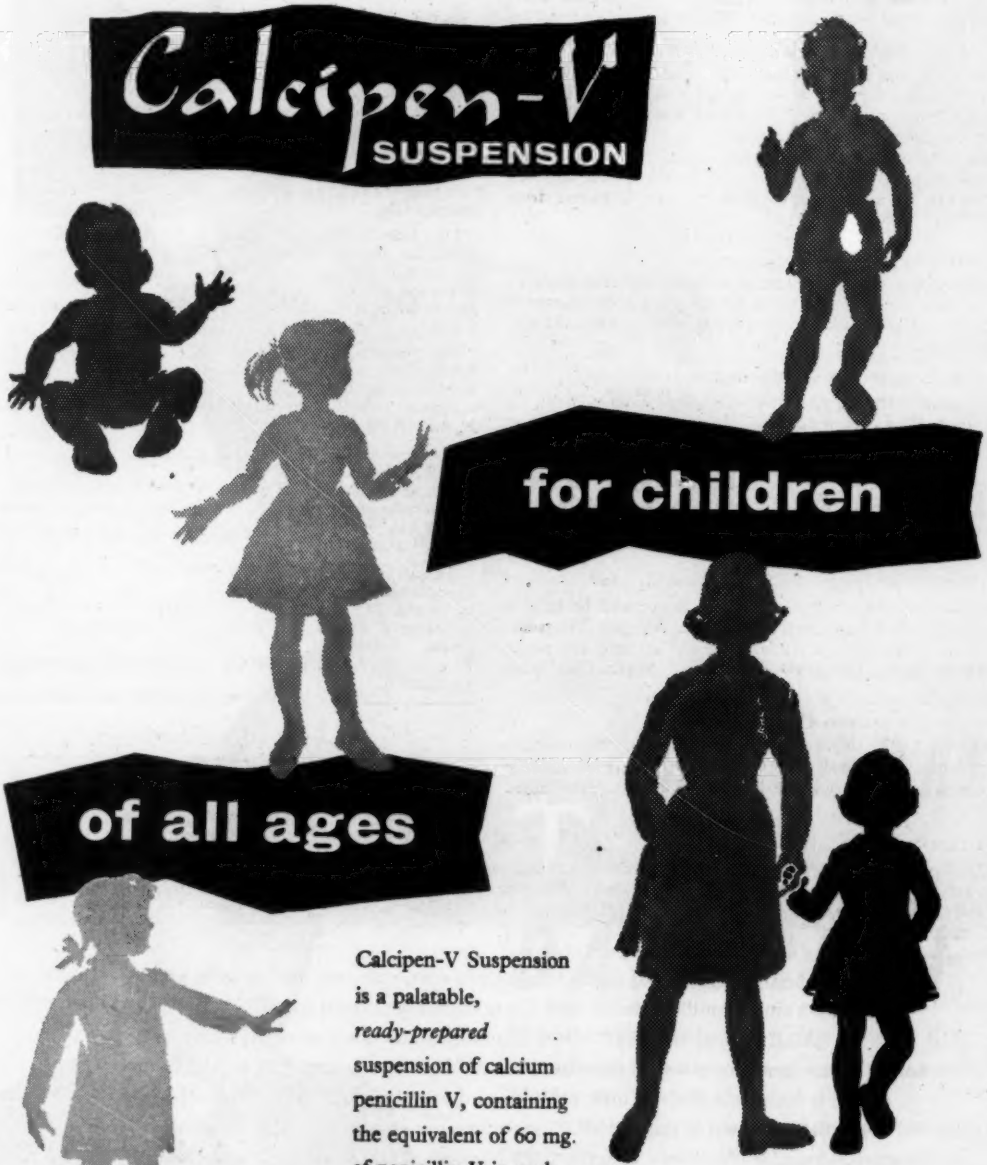

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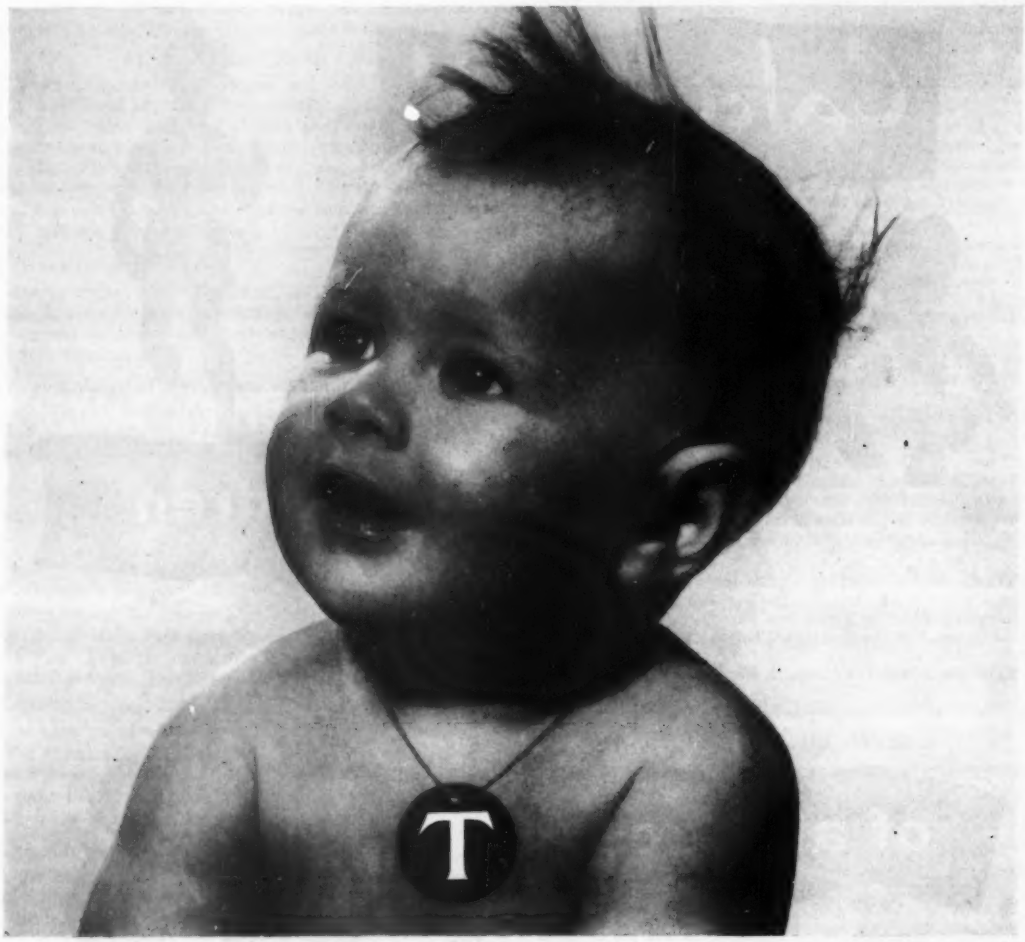

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See Lancet, July 22, 1899, p. 219

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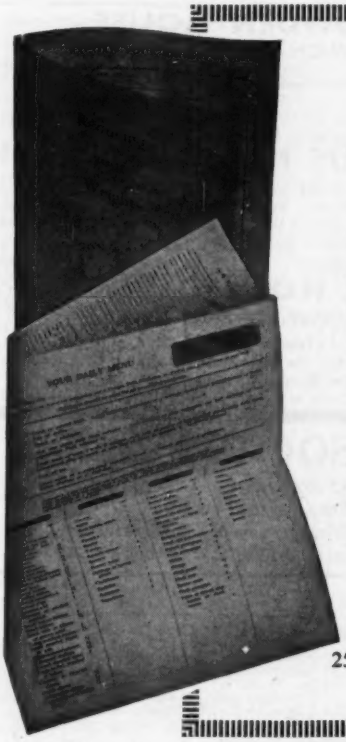

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Vacancies

	Page
ACADEMIC AND EDUCATIONAL SECTION	36
ADMINISTRATIVE	
Scotland. Northern R.H.B. Trainee Med. Supt.	43
ANÆSTHETICS	
Memorial, S.E.18. Sr. H.O.	38
Mile End, E.1. Sr. H.O.	38
Paddington Gen., W.9. Sr. H.O. ..	38
St. James', S.W.12. Regs.	38
St. Peter's, St. Paul's & St. Philip's. P.-t. Cons. or Sr. H.M.O.	37
Birmingham R.H.B. Cons.	37
Birmingham R.H.B. Regs.	39
Brighton. Royal Sussex County. Sr. H.O.	40
Bristol. Cossham & Frenchay H.M.C. H.O. or Sr. H.O.	40
Chichester Group H.M.C. Reg. ..	40
Doncaster Royal Infy. Sr. H.O. ..	40
Ipswich & East Suffolk. Sr. H.O. ..	41
Leeds R.H.B. Locum Regs.	41
Manchester, South H.M.C. Sr. H.O.	42
Northwood. Mount Vernon. Reg. ..	42
Romford. Oldchurch. Reg.	43
Sheffield United Hosps. & R.H.B. Sr. Reg.	44
Stockport. Stepping Hill. Sr. H.O. ..	44

West Bromwich & Dist. Hosps. M.C. Sr. H.O. 45
West Fife Hosps. B.O.M. Sr. H.O. .. 45
U.S.A. University of Minnesota Med. Center. Residencies 45

BIOCHEMISTRY
Melbourne, Australia. St. Vincent's. Director 37

CARDIOLOGY
National Heart, W.1. Reg. 38

CASUALTY
Hackney, E.9. H.O.'s 37
Metropolitan, E.8. Sr. H.O. 37
Mile End, E.1. Sr. H.O. 37
North Middlesex, N.18. Sr. H.O. .. 38
Paddington Green Child's, W.2. H.O. 38
Barnstaple. North Devon Infy. Sr. H.O. 39
Blackburn Royal Infy. Jr. H.M.O. or Sr. H.O. 39
Bolton. Royal Infy. Sr. H.O. .. 40
Huddersfield Royal Infy. Jr. H.M.O. or Sr. H.O. 41
Liverpool United Hosps. Temp. Sr. H.O. 42
Plymouth. South Devon & East Cornwall. Sr. H.O. 43
Rochester, Kent. St. Bartholomew's Sr. H.O. 43
Shoreham-by-Sea. Southlands. Locum Sr. H.O. 44
Southend-on-Sea. Gen. Sr. H.O. .. 44
Watford. Peace Mem. Sr. H.O. .. 45
Weymouth & Dist. Sr. H.O. 45
Channel Islands. Jersey Gen. Casualty Officer 45

CHEST AND TUBERCULOSIS
Canterbury. Kent & Canterbury. Sr. H.O. 40
Halifax. Northowram Hall. Sr. H.O. 40
Henley-on-Thames. Peppard Chest. Jr. H.M.O. 41
Holt, Norfolk. Kelling. Sr. H.O. .. 41
Rochford, Essex. Gen. Locum Reg. .. 43
Ventnor, I.W. Royal National Hosp. for Diseases of the Chest. Jr. H.M.O. 44

DERMATOLOGY
Nottingham City. Reg. 43

EAR, NOSE, AND THROAT
Bradford. Royal Eye & Ear. Sr. H.O. 40

GERIATRICS
Colchester Group H.M.C. Sr. H.O. .. 40
Manchester. Withington. Sr. H.O. .. 42

INFECTIOUS DISEASES
Eastern (Fevers), E.9. H.O. 37
Western, S.W.6. Reg. 38
Birmingham. Little Bromwich. Sr. H.O. 39

MEDICINE
Bethnal Green, E.2. Pre-reg. H.O. .. 37
Dulwich, S.E.22. H.O. 37
London, E.1. P.-t. Cons. 36
Paddington Gen., W.9. Pre-reg. H.O.'s 38
Wanstead, E.11. H.O. 38
Aberystwyth. Gen. H.O. 39
Beckenham, Kent. Pre-reg. H.O. .. 39
Birmingham R.H.B. Reg. 39
Birmingham. Selly Oak. H.O.'s .. 39
Bradford Royal Infy. Sr. H.O. & Locum Sr. H.O. 39
Carluke, Lanarkshire. Law. Sr. H.O. 40
Colchester Group H.M.C. Sr. H.O. .. 40
Hemel Hempstead. St. Paul's. Pre-reg. H.O. 41
Huddersfield. St. Luke's. Sr. H.O. .. 41
Leeds. Chapel Allerton. Sr. H.O. .. 42
Leeds R.H.B. Locum Regs. 41
Lincoln. St. George's. Pre-reg. H.O. .. 42
Llanelly. Jr. H.M.O. 41
Llanelly. Bryntirion. Temp. Jr. H.M.O. 41
Newark Gen. Jr. H.M.O. 42
Plymouth. South Devon & East Cornwall. Sr. H.O. 43
Rochdale & Dist. H.M.C. Reg. .. 43
Romford. Victoria. H.O. 43
Stoke-on-Trent. City Gen. Pre-reg. H.O. 44
Swindon & Dist. H.M.C. H.O. .. 44
Torquay. Torbay. Sr. H.O. 45
Windsor. King Edward VII. Pre-reg. H.O. 45

NEUROLOGY
London, E.1. Reg. 37
Birmingham R.H.B. Reg. 39

OBSTETRICS AND GYNÆCOLOGY
Forest Gate, E.7. Locum Reg. 37
Hackney, E.9. Locum Reg. 37
Hosp. for Women, W.1. Sr. H.O. .. 37
Mile End, E.1. H.O. 38
Paddington Gen., W.9. H.O. & Pre-reg. H.O. 38
South London Hosp. for Women & Child., S.W.4. H.O. 38
Woolwich Group H.M.C. H.O.'s .. 39
Birmingham United Hosps. Reg. .. 39
Canterbury. Kent & Canterbury. H.O. 40
Cardiff H.M.C. Sr. H.O. 40
Hastings. Buchanan. Locum Sr. H.O. 41
Newcastle R.H.B. Locum Cons. .. 37
Newcastle R.H.B. Regs. 42
Plymouth. South Devon & East Cornwall Gen. Hosp. Group. Reg. .. 43
Reading Combined Hosps. H.O. .. 43
Rochdale & Dist. H.M.C. H.O. .. 43
Stafford H.M.C. Sr. H.O. 44
Taplow. Canadian Red Cross Mem. H.O. 44

OPHTHALMOLOGY
Moorfields Eye, E.C.1. Reg. 38
Doncaster Royal Infy. Sr. H.O. .. 40
Leeds United Hosps. Sr. Reg. .. 41
Manchester United Hosps. Sr. H.M.O. 37
Nottingham Eye. Sr. H.O. 43
Oxford R.H.B. P.-t. Cons. 37

ORTHOPÆDICS
Ascot. Heatherwood Orthopædic. H.O.'s 39
Ayrshire Hosps. H.O. 39
Birmingham R.H.B. Regs. 39
Chertsey. St. Peter's. Sr. H.O. or Pre-reg. H.O. 40
Colchester Group H.M.C. H.O. .. 40
Edinburgh. Princess Margaret Rose Orthopædic. Sr. H.O.'s 40
Ipswich & East Suffolk. H.O. .. 41
Leeds R.H.B. Locum Regs. 41
Middlesbrough Gen. Sr. H.O. & H.O. 42
Neath Gen. Sr. H.O. 42
Portsmouth Group H.M.C. Sr. H.O. .. 43
Reading. Battle. H.O. 43
Swansea. Sr. H.O. 44
Tunbridge Wells. Pembury. Sr. H.O. 44
Watford. Peace Mem. H.O. 45
Welsh R.H.B. Locum Sr. H.M.O. .. 37
Wolverhampton. Royal. Sr. H.O. .. 45

PÆDIATRICS
Queen Elizabeth Hosp. for Child. H.O.'s 38
Westminster Child's, S.W.1. Reg. .. 39
Ashton, Hyde & Glossop H.M.C. Sr. H.O. & Jr. H.M.O. 39
Birmingham United Hosps. Sr. H.O. or Reg. 39
Canterbury. Kent & Canterbury. H.O. 40
Hull A Group H.M.C. Locum H.O. .. 41
Oxford R.H.B. Reg. 43
Oxford United Hosps. Reg. 43
Scotland. Eastern R.H.B. Sr. Reg. .. 43
St. Albans City. H.O. 44
Watford. Shrodells. Sr. H.O. 45

PATHOLOGY
West London, W.6. Reg. 38
Beverley. Westwood. Sr. H.O. .. 39
Liverpool United Hosps. Temp. Reg. 42
Macclesfield. Sr. H.O. 42
Oxford United Hosps. Sr. H.O. .. 43
Reading. Royal Berks. H.O. .. 43
Salford. Hope. Sr. H.O. 44

PSYCHIATRY
Marlborough Day, N.W.8. P.-t. Sr. H.O. 37
The Priory, S.W.15. Sr. H.M.O. .. 37
Birmingham R.H.B. Reg. 39
Gloucester. Horton Road & Coney Hill Hosps. Jr. H.M.O. 40
Leeds R.H.B. Cons. 37
Leeds R.H.B. Locum Regs. 41
Leicester. Towers Mental. Jr. H.M.O. 41
Manchester. Prestwich (Mental) Jr. H.M.O.'s. & Sr. H.O.'s 42
Manchester. Crumpsall. Sr. H.O. .. 42
Newmachar, Aberdeenshire. Kingseat. Reg. 42
Oxford R.H.B. Reg. 43
Southall. St. Bernard's Hosp. for Nervous & Mental Disorders. Sr. H.O. 44
Stafford. St. George's. Sr. H.O. & H.O. 44
St. Albans. Cell Barnes. Reg. .. 44
Welsh R.H.B. Reg. 45
Welsh R.H.B. Cons. 37
Worcester. Powick. Locum Sr. H.O. 45

RADIOLOGY
St. George's, S.W.1. Sr. Reg. 38
Scotland. South-Eastern R.H.B. Locum Reg. 43
Sheffield United Hosps. & R.H.B. Sr. Reg. 44

SURGERY
Bethnal Green, E.2. Pre-reg. H.O. .. 37
Connaught, E.17. H.O. 37
Hosp. of St. John & St. Elizabeth, N.W.8. H.O. 37
London Jewish, E.1. Sr. H.O. .. 37
Mile End, E.1. H.O. 38
Nelson, S.W.20. H.O. 38
Paddington Gen., W.9. Pre-reg. H.O.'s 38
Prince of Wales's, N.15. Pre-reg. H.O. 38
Queen Elizabeth Hosp. for Child. H.O. 38
South London Hosp. for Women & Child., S.W.4. Reg. 38
St. Ann's Gen., N.15. H.O. 38
St. Giles', S.E.5. H.O. 38
Wanstead, E.11. Sr. H.O. 38
Aberystwyth. Gen. Sr. H.O. 39
Aberystwyth. Gen. H.O. 39
Accrington. Victoria. H.O. 39
Ayrshire Hosps. H.O. 39
Bebington. Clatterbridge. H.O. .. 39
Beckenham, Kent. Pre-reg. H.O. .. 39
Birmingham. Solihull. Pre-reg. H.O. 39
Birmingham United Hosps. H.O. .. 39
Brighton. Royal Sussex County. Pre-reg. H.O. 40
Canterbury. Kent & Canterbury. H.O. 40
Cardiff H.M.C. Sr. H.O. 40
Colchester Group H.M.C. Locum H.O. 40
Cuckfield, Sussex. Sr. H.O. & Pre-reg. H.O. 40
East Grinstead. Queen Victoria. H.O. or Locum 40
Hastings. St. Helen's. Pre-reg. H.O. 41
Hereford County. Pre-reg. H.O. .. 41
Hereford County. Locum H.O. .. 41
Hereford. Gen. Pre-reg. H.O. .. 41
Hitchin. Lister. H.O. 41
Hitchin. North Herts. H.O. 41
Hove Gen. Pre-reg. H.O. 41
Huddersfield Royal Infy. H.O. .. 41
Huntingdon County. H.O. 41
Ipswich & East Suffolk. Pre-reg. H.O. 41
Kettering & Dist. Gen. Locum Pre-reg. H.O. 41
Kidderminster & Dist. Gen. Locum Pre-reg. H.O. 41
Leeds R.H.B. Locum Regs. 41
Leicester Royal Infy. H.O.'s or Sr. H.O.'s 41
Loughborough Gen. H.O. or Sr. H.O. 42
Maidstone. West Kent Gen. Pre-reg. H.O. 42
Middlesbrough. Hemlington. Sr. H.O. 42
Middlesbrough. North Ormesby. H.O. 42
Newcastle Gen. Sr. H.O. 42
Newcastle R.H.B. Reg. 42
Newcastle United Hosps. Sr. Reg. .. 42
Newton Abbot, S. Devon. Sr. H.O. .. 43
Plymouth. South Devon & East Cornwall. Pre-reg. H.O.'s 43
Pontypridd. East Glamorgan. Sr. H.O. 43
Portsmouth Group H.M.C. Pre-reg. H.O.'s 43
Reading. Royal Berks. H.O. 43
Rochester, Kent. St. Bartholomew's. H.O. 43
Romford. Victoria. H.O. 43
Sheffield R.H.B. P.-t. Cons. 37
Shrewsbury. Royal Salop Infy./Copthorne. H.O. 44
Shrewsbury. Royal Salop Infy./Copthorne. H.O. 44
Southampton. Royal South Hants. H.O. 44
St. Albans City. H.O. 44
Stockport. Stepping Hill. Sr. H.O. .. 44
Stockport Infy. H.O. 44
Stoke-on-Trent. City Gen. Pre-reg. H.O. 44
Taunton & Somerset. Sr. H.O. .. 44
Whitehaven, Cumberland. Pre-reg. H.O. or Sr. H.O. 45
Winchester. Royal Hants County. H.O. 45
Wolverhampton. Royal. Sr. H.O. .. 45
Workington Infy. Pre-reg. H.O. or Sr. H.O. 45

THORACIC SURGERY
North Middlesex, N.18. Sr. H.O. .. 38
Cambridge. Papworth. Sr. H.O. .. 40
Ilkley. Middleton. Sr. H.O. 41

GENERAL
Canada. Grace Hosp., Winnipeg. Residencies & Sr. Internships .. 45
Canada. Victoria Hosp., London, Ontario. Jr. Rotating Interns .. 45
Michigan, U.S.A. Oakwood. Rotating Internship 45
U.S.A. Bridgeport, Connecticut. Rotating Internships & Residencies 45
U.S.A. Norton Mem. Infy., Louisville. Rotating Internships 45

PUBLIC APPOINTMENTS 45

GENERAL PRACTICE 45

MISCELLANEOUS 45

The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies, but candidates may normally visit the hospital by appointment.

Academic and Educational

ROYAL COLLEGE OF PHYSICIANS OF LONDON

JOHN ST. CLAIR ELKINGTON, M.D., F.R.C.P., will deliver the Lumleian Lectures on TUESDAY, 15TH APRIL, and THURSDAY, 17TH APRIL, 1958, at 5 P.M., at the College, Pall Mall East, S.W.1.

Subject : "Cerebral Vascular Disease in the Light of Modern Techniques."

Any member of the medical profession admitted on presentation of doctor's card.

By order of the President,
HAROLD BOLDERO, Registrar.

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SYMPOSIUM ON CHRONIC BRONCHITIS. THURSDAY, 24TH APRIL, 3.30–6.30 P.M. Newcastle upon Tyne.

Tickets, including tea and sherry, 10s. each, from NAPT, Tavistock House North, London, W.C.1.

UNIVERSITY OF EDINBURGH

CHAIR OF MEDICINE

The Curators of Patronage will shortly proceed to make an appointment to the above Chair, which will become vacant on 1ST APRIL, 1959.

The terms and conditions of appointment may be obtained from the unuersigned, with whom applications (8 copies), giving the names of 2 referees and including any testimonials or evidence candidates may wish to offer, should be lodged not later than 24th May, 1958.

Overseas candidates may submit 1 copy of their application, which should be received not later than 31st May, 1958.

G. I. L. SOMERVILLE, W.S.,
Secretary to the Curators of Patronage.
4, Albyn-place, Edinburgh, 2. March, 1958.

UNIVERSITY OF ST. ANDREWS

COMBINED CLINICAL AND MEDICAL SCIENCES COURSE

Graduates in Medicine and Surgery are invited to make application for a combined Clinical and Medical Sciences Course to be held in Queen's College, Dundee, from October, 1958, to March, 1959.

All those taking the Combined Clinical and Medical Sciences Course will have :—

(1) A clinical attachment in the special subject of their choice. In 1958–59 the following subjects will be offered :—

General Surgery	Respiratory Diseases
General Medicine	Obstetrics
Cardiology	Gynæcology
Cardiovascular Surgery	Pædiatrics
Endocrinology	Psychiatry
Dermatology	Ophthalmology
Hæmatology	Oto-rhino-laryngology
Infectious Diseases	Orthopædics

(2) A Supervisor who would guide their reading and laboratory work in relation to their specialty ; and

(3) All would attend the medical sciences course.

The number accepted for this educational programme will be small and only 1 or at the most 2 candidates will get an attachment in each special subject. The Eastern Regional Hospital Board will give the successful candidate an honorary clinical assistantship within the Unit where he is studying the special subject of his choice. The Supervisor will not only guide the reading and laboratory work of the student but will in appropriate cases allow him to take part in current research programmes. The objective of the medical sciences course which all the postgraduates, whether medical, surgical, or other specialists, will follow is to bring the postgraduate student up to date on current trends in the medical sciences which are of importance to future medical developments.

In addition to this course, the Medical School offers weekly open postgraduate lectures by distinguished visitors and a course of lectures on scientific methods which postgraduate students in the school will be free to attend.

The fee for the course will be £36.

Applications should be submitted before 1st July, 1958, to the Dean of the Faculty of Medicine, University of St. Andrews, Queen's College, Dundee, from whom further information may be obtained.

UNIVERSITY OF ST. ANDREWS

POST-GRADUATE COURSE IN ANATOMY AND PHYSIOLOGY

Graduates in Medicine and Surgery are invited to make application for a Course in Anatomy and Physiology (including Biochemistry) to be held in the Pre-clinical Departments of St. Salvator's College, University of St. Andrews, from October, 1958, to March, 1959.

The number of graduates accepted for this course will be small. They will be attached to, and expected to take some part in the work of, the Anatomy and Physiology Departments. Instruction will be given, formally and informally, in systematic, practical and applied aspects of anatomy, physiology and biochemistry, and students will be afforded opportunity of gaining experience in methods to be individually selected. They will be required to take part in tutorial discussions both with members of staff and with medical undergraduates, and to make themselves familiar with current teaching. The Anatomy Department is responsible for the teaching of histology, and has particular interests in bone, arthrology, heart and central nervous system. The Department of Physiology and Biochemistry operates a course in applied physiology and biochemistry for senior medical students, and is equipped to supervise techniques in neurophysiology and neurochemistry, protein and carbohydrate chemistry, and various aspects of medical biophysics.

The fee for the course will be £36.

Applications should be submitted before 1st July, 1958, to the Dean of the Faculty of Medicine, University of St. Andrews, Queen's College, Dundee, from whom further information may be obtained.

INSTITUTE OF CHILD HEALTH
UNIVERSITY OF LONDON

SIMPSON SMITH MEMORIAL PRIZE, 1959

A prize of 100 guineas will be awarded for the best essay on "Spina Bifida" received by 31ST DECEMBER, 1959.

Apply for rules to Secretary, Institute of Child Health, Great Ormond-street, London, W.C.1.

POSTGRADUATE COURSE IN PÆDIATRIC SURGERY

A ONE-DAY COURSE on Recent Advances in Pædiatric Surgery, organised by the Evelina Hospital and Department of Child Health of Guy's Hospital, is to be held at the Evelina Hospital on Saturday, April 19.

Talks will be given by : Mr. R. H. Brain (the lungs), Mr. D. N. Ross (the heart), Mr. J. S. Batchelor and Mr. T. T. Stamm (orthopædics), Dr. P. R. Evans (jaundice), Dr. R. C. MacKeith (abdominal pain), Dr. M. C. Joseph (neonatal conditions), Mr. N. L. Eckhoff and Mr. P. Clarkson (plastic surgery), Mr. M. A. Falconer and Mr. Peter Schurr (neurosurgery), Mr. F. R. Kilpatrick (genitourinary surgery), Mr. Rex Lawrie (general surgery), Mr. P. V. Reading (mastoiditis), and Dr. Vaughan (psychological reactions to injury).

The fee for the course, including lunch, is £2 2s.

Applications (limited to 30) to Mr. REX LAWRIE, Department of Surgery, Guy's Hospital.

GUY'S HOSPITAL DENTAL SCHOOL. Applications are invited for the appointment of DENTAL RESEARCH FELLOW in the Department of Dental Medicine, to commence duties on 1st October, 1958. Candidates should have had some experience of research in a relevant branch of science. Initial salary in a scale £900–£1150, with increments of £100 p.a., according to experience and qualifications, plus family allowance and superannuation. The appointment is for 3 years in the first instance and the holder is eligible for reappointment for a limited period.

Forms of application may be obtained from the Dean, The Dental School, Guy's Hospital, London, S.E.1, to whom applications with the names and addresses of 2 referees should be sent not later than Saturday, 19th April, 1958.

UNIVERSITY COLLEGE LONDON (Gower-street, W.C.1) requires Full-time ASSISTANT LECTURER (Demonstrator) IN ANATOMY (Professor J. Z. YOUNG) to undertake teaching and research. Duties to commence 1st September, 1958, or earlier. Salary within the range £850–£1050 p.a., plus £60 London allowance. Superannuation and family allowance.

Applications, to be received by 15th May, should be sent to the Secretary of the College, from whom further particulars may be obtained.

UNIVERSITY OF GLASGOW. Applications are invited for a LECTURESHIP IN EXPERIMENTAL SURGERY. Salary scale £900–£1900. Initial salary according to experience and qualifications. F.S.S.U. and family allowance benefits.

Applications (12 copies) should be lodged, not later than 19th April, 1958, with the undersigned, from whom further particulars may be obtained.

ROBT. T. HUTCHESON, Secretary of University Court.

THE UNIVERSITY OF LIVERPOOL. Department of OBSTETRICS AND GYNÆCOLOGY. Applications are invited for the whole-time post of TUTOR IN OBSTETRICS, resident in the Liverpool Maternity Hospital. Previous resident experience in obstetrics and gynæcology is essential and higher qualifications in these subjects are desirable. The appointment will be for 1 year in the first instance, commencing 1st October, 1958. The salary will be within the range £800–£1400 p.a., according to qualifications and experience, together with board residence.

Applications, stating age, qualifications and experience, together with the names of 3 referees, should be received not later than 28th April, 1958, by the Registrar, from whom further particulars of the conditions of appointment may be obtained.

THE UNIVERSITY OF MANCHESTER. Applications are invited from science graduates or from persons who are medically qualified for the post of ASSISTANT LECTURER IN PHARMACOLOGY in the Faculty of Medicine. Salary scales p.a. are (*a*) for medically qualified persons, £900–£100–£1300 ; (*b*) for non-medically qualified persons, £700–£50–£850. The posts offer opportunity for research leading to a higher degree. Membership of F.S.S.U. and Children's Allowance Scheme.

Applications should be sent not later than 19th April, 1958, to the Registrar, The University, Manchester, 13, from whom further particulars and forms of application may be obtained.

UNIVERSITY OF NATAL—NATAL PROVINCIAL ADMINISTRATION (Joint Medical Staff Establishment). Applications are invited from medical practitioners (registered or registrable with the South African Medical and Dental Council) for the post of PROFESSOR OF ANATOMY in the Faculty of Medicine of the University of Natal, Durban. The salary attached to the post is £2700 p.a. In addition, a temporary variable cost of living allowance may be paid to persons with dependants in terms of the Union Government regulations. The successful candidate will be required to assume duties on 1st January, 1959.

The prescribed application form and further particulars may be obtained from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1. Applications close in South Africa and London on 15th May, 1958.

Hospital Services: Senior Appointments

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of Part-time CONSULTANT PHYSICIAN to the Hospital. A higher qualification in medicine is required. The successful candidate will be required to attend on not less than 3 half-days weekly.

Applications (12 copies), giving the names and addresses of 3 referees, should be received by the undersigned by 8th May, 1958. H. BRIERLEY, House Governor.

ST. PETER'S, ST. PAUL'S AND ST. PHILIP'S HOSPITALS. Required CONSULTANT ANÆSTHETIST. 1 session weekly (Thursday mornings). Applicants must be of Consultant or Senior Hospital Medical Officer grade.

Applications, stating age and qualifications (9 copies) with names of 3 referees, to the House Governor, at St. Peter's Hospital, Henrietta-street, W.C.2.

THE PRIORY, Roehampton, S.W.15. Assistant Psychiatrist required at the above private Hospital (90 Beds). National Health Service rate of pay at Senior Hospital Medical Officer level plus free accommodation. Superannuation scheme. Interesting work with approximately 230 admissions per year.

Further details from the Medical Superintendent.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Whole-time CONSULTANT in Anæsthetics, Birmingham (Selly Oak) Group, duties mainly at Selly Oak Hospital, Wide experience specialty and higher qualification required.

Applications (15 copies), stating name, age, nationality, present and previous appointments and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, by 5th May, 1958.

LEEDS REGIONAL HOSPITAL BOARD. Consultant in Child Psychiatry (whole-time or maximum part-time). Duties at Child Psychiatric Clinics of the County Boroughs of Wakefield and Dewsbury (2 sessions per week each); remainder (5 or 7 sessions) at West Riding County Council Clinics at Wakefield, Mirfield, Shipley, Skipton, Goole, and Todmorden. The Board will also consider applications from suitably qualified practitioners for limited sessions only. Candidates should indicate how many sessions they can undertake and at which centre or centres.

Applications (12 copies), stating age, qualifications and details of present and previous appointments with dates, and names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, by 20th May, 1958.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL, MANCHESTER, 13. SENIOR HOSPITAL MEDICAL OFFICER in Ophthalmology. Full-time, or maximum part-time, non-resident post. Previous experience in specialty essential.

Application form obtainable from F. J. CARLE, Secretary, United Manchester Hospitals, to be returned as soon as possible.

NEWCASTLE REGIONAL HOSPITAL BOARD. West CUMBERLAND GROUP OF HOSPITALS. Locum CONSULTANT OBSTETRICIAN AND GYNÆCOLOGIST required immediately, whole-time, for a period of 3 months in the first place.

Applications forthwith to the Senior Administrative Medical Officer, 72, Warwick-road, Carlisle.

OXFORD REGIONAL HOSPITAL BOARD. Consultant in Ophthalmology, part-time, for 7 sessions a week to the Aylesbury/High Wycombe Area Department of Ophthalmology. The apportionment of time between the 2 areas will be: 5 sessions Aylesbury; 2 sessions High Wycombe. The successful candidate will be required to reside in the Aylesbury area where his main duties will be undertaken.

Applications, 12 copies, with full details to the Secretary, Oxford Regional Hospital Board, 43, Banbury-road, Oxford, by 2nd May.

OXFORD REGIONAL HOSPITAL BOARD. Consultant in Ophthalmology, part-time, for 3 sessions a week to the Oxford/Banbury Area Department of Ophthalmology for duties at the Horton General Hospital, Banbury. The successful candidate must be prepared to live in the Banbury area.

Applications (12 copies), giving full details, to the Secretary, Oxford Regional Hospital Board, 43, Banbury-road, Oxford, by 2nd May.

SHEFFIELD REGIONAL HOSPITAL BOARD. Consultant GENERAL SURGEON for 7 notional half-days per week required for the Doncaster Royal Infirmary.

Application form and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 5th May, 1958.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens ASSISTANT TRAUMATIC SURGEON (Senior Hospital Medical Officer) required St. David's Hospital, Cardiff, 5th–18th May, 1958.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

WELSH REGIONAL HOSPITAL BOARD. Whole-time CONSULTANT CHILD PSYCHIATRIST. This is a new post and the successful candidate will be required to develop Child Guidance Services in the Glamorgan area: the headquarters of the service will be at Glanrhyd House, Bridgend. Candidates should have had appropriate training and a wide experience in Child Psychiatry.

Applications (12 copies), naming 3 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 21 days.

MELBOURNE. ST. VINCENT'S HOSPITAL. University OF MELBOURNE. Applications are invited for the position of DIRECTOR of the Clinical Biochemical Laboratories of St. Vincent's Hospital, Melbourne.

Qualifications: Medical graduate with extensive training in clinical biochemistry and expert knowledge of biochemical investigation in the problems of general medicine.

Salary: £3000 Australian with increments of £100 to £3500 Australian. Limited private practice within the Department may be allowed.

Superannuation is available. Reasonable travelling expenses will be allowed for successful applicant.

Applicants should furnish details of their nationality, age, marital status, experience and published work. 2 testimonials should be submitted and the names of 3 referees who may be consulted.

Further information may be obtained from the Chief Executive Officer and Secretary, St. Vincent's Hospital, Victoria Parade, Melbourne, N.6, Victoria, Australia.

E. W. R. GRACE, Chief Executive Officer and Secretary.

Hospital Services: Junior Appointments

BETHNAL GREEN HOSPITAL, Cambridge Heath-road, E.2. HOUSE PHYSICIAN, pre-registration post, vacancy 7th May, 1958.

Applications, stating experience, and copies of 2 testimonials, to Hospital Secretary.

BETHNAL GREEN HOSPITAL, Cambridge Heath-road, London, E.2. HOUSE SURGEON, pre-registration post, vacancy 7th May, 1958.

Applications, stating experience, and copies of 2 testimonials, to Hospital Secretary.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (123 Beds.) HOUSE SURGEON required for 6 months. Post vacant 12th May, 1958. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

DULWICH HOSPITAL, East Dulwich-grove, S.E.22. HOUSE OFFICER (general medical duties, also some neurology and skin beds). Recognised pre-registration post. Vacant 2nd May.

Applications, with copy testimonials or names of 2 referees, to Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital, not later than 14th April.

EASTERN HOSPITAL (Fevers), London, E.9. Registered HOUSE PHYSICIAN. Duties may include some work in Chest Unit. Facilities for postgraduate study.

Apply Group Secretary, Hackney Hospital, E.9, by 19th April.

FOREST GATE HOSPITAL, Forest-lane, E.7. Locum RESIDENT OBSTETRIC AND GYNÆCOLOGICAL REGISTRAR required from mid-April until 3rd July, 1958.

Apply immediately to the Secretary at the above address, quoting full details and names of 2 referees.

HACKNEY HOSPITAL, London, E.9. (General—853 Beds.) Applications are invited from registered practitioners for the following 6-month Resident House Officer posts, now vacant:—

(*a*) CASUALTY OFFICER AND HOUSE PHYSICIAN, Skin Department.

(*b*) CASUALTY OFFICER AND HOUSE SURGEON (E.N.T.).

Apply Secretary, above address, quoting HH (*a*) or (*b*).

HACKNEY HOSPITAL, London, E.9. Applications for the Resident appointment of Locum REGISTRAR (obstetrics and gynæcology) should be sent to Secretary, above address, quoting HH/LR.

HOSPITAL FOR WOMEN, Soho-square, W.1. (Affiliated to the Middlesex Hospital.) Applications are invited for a full-time post of RESIDENT SENIOR GYNÆCOLOGICAL HOUSE OFFICER, vacant on 1st July, 1958. Appointment is for 6 months but the holder can apply for an extension of 6 months. Salary in accordance with the terms laid down for medical and dental staffs, less a deduction of £150 p.a. for residential emoluments. The appointment is recognised for the M.R.C.O.G. examination.

Applications, stating age, nationality, qualifications and experience, supported by the names and addresses of 2 referees, must reach the undersigned not later than Saturday, 12th April.

D. C. EMERY, Secretary.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, London, N.W.8. Applications are invited from pre-registration or registered medical practitioners (Male) for the appointment of HOUSE SURGEON to become vacant on Friday, 23rd May, 1958. This post is recognised for purposes of the F.R.C.S. (Eng.). Appointment will be for a period of 6 months. National Health Service salary.

Applications should reach the Secretary on or before Saturday, 26th April together with copies of 3 recent testimonials.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of REGISTRAR to the Department of Electroencephalography. This department is part of the Department of Neurology; the work is closely associated with the department of neurosurgery and the post offers good opportunities for clinical research.

Applications (12 copies), giving the names and addresses of 3 referees, should be received by the undersigned by 11th April, 1958. H. BRIERLEY, House Governor.

LONDON JEWISH HOSPITAL, Stepney Green, E.1. (130 Beds.) RESIDENT SENIOR HOUSE OFFICER (Surgical Department). Post vacant 1st May, 1958.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Hospital Secretary not later than 10th April, 1958.

MARLBOROUGH DAY HOSPITAL, 38, Marlborough-place, N.W.8. SENIOR HOUSE OFFICER (psychiatric) required for 6 sessions per week, or divided. Hospital may be visited by direct appointment.

Detailed applications, stating age, qualifications, experience, and names of 2 referees, to Medical Director by 14th April, 1958.

METROPOLITAN HOSPITAL, Kingsland-road, London, E.8. Applications are invited from registered medical practitioners for the post of CASUALTY OFFICER (Senior House Officer grade) vacant 18th April. Resident or non-resident. Post recognised for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with 3 testimonials, to the Hospital Secretary.

MILE END HOSPITAL, Bancroft-road, London, E.1. (479 Beds.) CASUALTY AND RECEIVING WARD OFFICER (Senior House Officer grade). Recognised for F.R.C.S. Post vacant 1st May, 1958.

Application forms, obtainable from Physician-Superintendent, to be returned by 18th April, 1958, with copies of not more than 3 testimonials.

MILE END HOSPITAL, Bancroft-road, London, E.1. (479 Beds.) HOUSE SURGEON (pre- or post-registration). Post vacant 29th April, 1958.

Application forms, obtainable from Physician-Superintendent, to be returned by 11th April, with copies of not more than 3 testimonials.

MILE END HOSPITAL, Bancroft-road, London, E.1. (479 Beds.) HOUSE SURGEON (obstetrics and gynæcology) (post-registration). Recognised for D.Obst.R.C.O.G. Post vacant 4th May, 1958.

Application forms, obtainable from Physician-Superintendent, to be returned by 11th April, with copies of not more than 3 testimonials.

MILE END HOSPITAL, Bancroft-road, London, E.1. (479 Beds.) ANÆSTHETIST (Senior House Officer grade). Recognised for D.A. and F.F.A. R.C.S. Post vacant 5th May, 1958.

Application forms, obtainable from Physician-Superintendent, to be returned by 11th April, with copies of not more than 3 testimonials.

MEMORIAL HOSPITAL, Shooters Hill, S.E.18. Senior HOUSE OFFICER (anæsthetics), vacant 4th May. The post provides good experience and is recognised for F.F.A. R.C.S and D.A. 6 months' resident appointment and may then be renewed.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

MOORFIELDS EYE HOSPITAL (City-road Branch), London, E.C.1. Applications are invited for the post of SIXTH HOUSE SURGEON (Registrar, non-resident). The appointment is for a period of 4 months from 1st July, 1958, and the holder of the post at the completion of that time will be eligible for appointment as Fifth, Fourth, Third, Second Resident Surgical Officer, and subsequently as Senior Resident Officer, for similar periods.

Applications should be submitted on the official form obtainable from the undersigned, stating age and qualifications, together with testimonials and photograph, and be received not later than 21st April, 1958.

J. P. HEMING, House Governor.

NATIONAL HEART HOSPITAL, Westmoreland-street, W.1 (with which is associated the Institute of Cardiology). The Board of Governors invites applications for the post of REGISTRAR. Applicants should have been fully trained in general medicine and should possess a higher medical qualification. Opportunities for research available.

Applications, with copies of 3 recent testimonials, should be sent to me not later than Saturday, 19th April, 1958.

ROBERT G. E. WHITNEY, Secretary to the Board.

NELSON HOSPITAL, Kingston-road, Merton, S.W.20. (123 Beds.) HOUSE SURGEON (resident). Approved for pre-registration service. Post vacant 1st May.

Applications, stating age, qualifications, &c., and the names and addresses of 2 referees, to the Secretary at above address.

NORTH MIDDLESEX HOSPITAL, London, N.18. Casualty OFFICER (Senior House Officer grade). 6 months' appointment, starting 5th May. Non-resident post, recognised for F.R.C.S. 3 Casualty Officers employed; duties include service with the 3 main surgical units.

Applications, stating age, qualifications, experience, together with copies of recent testimonials and/or names of 2 referees, to the Hospital Secretary, by 9th April.

NORTH MIDDLESEX HOSPITAL, London, N.18. Senior HOUSE OFFICER for Thoracic Surgical Unit, resident, required. 6 months' appointment, with possible extension to 1 year. The post, which is recognised for F.R.C.S., offers experience in all types of tuberculous and non-tuberculous thoracic surgery.

Applications, stating age, nationality, qualifications, experience, with copies of recent testimonials and/or names of 2 referees, to Hospital Secretary.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN, Hackney-road, E.2; Shadwell, E.1; BANSTEAD, SURREY. 2 HOUSE OFFICER appointments.

(i) for 2 consecutive periods of 6 months, commencing 1st June, 1958, first period House Physician, Hackney-road, second period House Surgeon, Hackney-road (2 months), and Casualty Officer, Shadwell (4 months).

(ii) for 2 consecutive periods of 6 months, commencing 1st June, 1958, first period House Physician, Shadwell, second period House Surgeon, Banstead (3 months), and Casualty Officer, Hackney-road (3 months).

Application forms may be obtained from the Secretary at Hackney-road and should be returned, with copies of not more than 3 testimonials, not later than 12th April, 1958.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN, Hackney-road, E.2; Shadwell, E.1; BANSTEAD, SURREY. HOUSE OFFICER appointment for 6 months, commencing 1st July, 1958, at Hackney-road, 2 months as House Surgeon and 4 months as Casualty Officer.

Application forms may be obtained from the Secretary at Hackney-road, and should be returned with copies of not more than 3 testimonials, not later than 12th April, 1958.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. Applications are invited for the appointment of RESIDENT JUNIOR HOUSE SURGEON for Casualty (pre-registration, first or second post) to the above Hospital for a period of 6 months, vacant 27th May, 1958.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 19th April, 1958.

PADDINGTON GREEN CHILDREN'S HOSPITAL. (ST. MARY'S HOSPITAL, W.2.) Applications are invited for the post of CASUALTY OFFICER. Post-registration appointment, non-resident, House Officer's grade, tenable for 6 months as from 1st May, 1958.

Applications, stating age, nationality, qualifications with dates, and experience, with copies of 3 recent testimonials, should reach the Secretary not later than 12th April, 1958.

PADDINGTON GENERAL HOSPITAL, Harrow-road, W.9. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics—resident on duty). Recognised for D.A. and F.F.A. R.C.S.

Applications, stating age, qualifications, medical school, experience, together with names of 2 referees, to Hospital Secretary by 14th April, 1958.

PADDINGTON GENERAL HOSPITAL, Harrow-road, W.9. Applications are invited for the undermentioned posts commencing 1st June, 1958. Preference will be given to pre-registration candidates where appropriate :—

2 HOUSE SURGEONS (general surgery). Pre-registration posts recognised for F.R.C.S.

2 HOUSE SURGEONS (obstetrics and gynæcology). 1 pre-registration post. Both recognised for M.R.C.O.G. in obstetrics.

4 HOUSE PHYSICIANS (general medicine). Pre-registration posts.

Applications, stating age, qualifications, medical school, experience, together with names of 2 referees, to Hospital Secretary, by 30th April, 1958.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of OBSTETRIC HOUSE SURGEON. Recognised for the M.R.C.O.G. Appointment for 6 months from 24th April, 1958.

Forms of application from the Secretary.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from registered Women medical practitioners for the post of Full-time SURGICAL REGISTRAR (recognised for the F.R.C.S.) resident, or non-resident if living near the Hospital. Vacant 8th June, 1958. The appointment is normally for 2 years, but subject to review at the end of first year. Canvassing will disqualify, but candidates are invited to visit the Hospital if they so desire.

Form of application from the Secretary, Lambeth Group Hospital Management Committee, Renfrew-road, S.E.11, to whom completed applications should be returned not later than 19th April, 1958.

ST. ANN'S GENERAL HOSPITAL, N.15. Applications are invited for the appointment of RESIDENT HOUSE SURGEON (third post) to above Hospital for a period of 6 months from 16th May, 1958.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 19th April, 1958.

ST. GEORGE'S HOSPITAL, S.W.1. Applications are invited for the whole-time post of SENIOR REGISTRAR to the Department of Radiology at this Hospital. This is a non-resident appointment, and the successful candidate will be required to take up duty not later than 1st July, 1958.

Applications, stating age, education, qualifications, experience and the names and addresses of 2 referees, should reach the undersigned not later than 26th April, 1958.

P. H. CONSTABLE, House Governor.

ST. GILES' HOSPITAL, Camberwell, S.E.5. House SURGEON (casualty duties, with some general surgery, E.N.T., and eye beds). Recognised for pre-registration purposes.

Applications, with copy testimonials or names of 2 referees, to Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital, East Dulwich-grove, S.E.22, not later than 15th April.

ST. JAMES' HOSPITAL, Balham, London, S.W.12. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRARS (2) required. 1 post vacant 1st June and 1 post vacant 11th July. Posts recognised for D.A. and F.F.A. R.C.S.

Application forms, obtainable from Group Secretary, Wandsworth Hospital Group, at above address, to be completed and returned by 12th April.

WANSTEAD HOSPITAL, Hermon Hill, E.11. (191 Beds.) Applications are invited for post of SENIOR HOUSE OFFICER (resident). Salary £819 10s. p.a. less £150 p.a. for board-residence. Post includes care of general surgical and orthopædic cases and duties in Casualty Department. Recognised for F.R.C.S.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WANSTEAD HOSPITAL, Hermon Hill, London, E.11. (191 Beds.) HOUSE PHYSICIAN required, post vacant 3rd May, 1958.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WESTERN HOSPITAL, Seagrave-road, Fulham, S.W.6. Applications are invited for appointment as REGISTRAR (infectious diseases). Post now vacant. The Infectious Diseases Unit includes a Regional Centre for the treatment of respiratory complications of poliomyelitis, and there are excellent facilities for research. The Hospital is well situated for those wishing to pursue postgraduate studies. Experience in infectious diseases desirable but not essential, but good paediatric or general medicine experience is acceptable. Candidates may visit the Hospital by arrangement with the Physician-Superintendent.

Applications (5 copies), to be submitted by 18th April, 1958, on forms obtainable from, and returnable to Group Secretary, 5, Collingham-gardens, London, S.W.5. (L.168.)

WEST LONDON HOSPITAL, Hammersmith-road, Lon-don, W.6. Whole-time NON-RESIDENT REGISTRAR (pathology) required as soon as possible.

Applications, stating age, qualifications, experience, names 2 referees, to Secretary, Board of Governors, The Hammersmith, West London and St. Mark's Hospitals, Ducane-road, London, W.12, by 14th April.

WESTMINSTER CHILDREN'S HOSPITAL (Westminster HOSPITAL TEACHING GROUP). MEDICAL REGISTRAR required from 1st May, 1958, for 1 year, renewable for a second year.

Apply, naming 3 referees, to the Secretary, Westminster Children's Hospital, Vincent-square, S.W.1, by 12th April, 1958.

WOOLWICH GROUP HOSPITAL MANAGEMENT COMMITTEE.

OBSTETRICAL HOUSE OFFICER. British Hospital for Mothers and Babies. Vacant mid-May. Recognised for M.R.C.O.G., or D.Obst.R.C.O.G.

HOUSE SURGEONS (obstetrics and gynæcology). 2 posts vacant in June. 1 at St. Nicholas Hospital, Plumstead, recognised for D.Obst.R.C.O.G., or 3 months obstetrics, 3 months gynæcology for M.R.C.O.G. 1 at Memorial Hospital, recognised for M.R.C.O.G. (6 months gynæcology). Small Obstetric Unit providing good experience.

Applications to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ABERYSTWYTH, CARDIGANSHIRE. GENERAL HOSPITAL. MID-WALES HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (surgical) required (resident). Post recognised for F.R.C.S. examination. Vacancy from the middle of April, 1958.

Applications, stating age, experience, &c., to the Group Secretary, Mid-Wales Hospital Management Committee, 31, North-parade, Aberystwyth, Cardiganshire.

ABERYSTWYTH. GENERAL HOSPITAL. 2 Junior HOUSE OFFICERS (1 medical and 1 surgical) required at the above Hospital.

Applications to the Group Secretary, Mid-Wales Hospital Management Committee, 31, North-parade, Aberystwyth, Cardiganshire.

ACCRINGTON. VICTORIA HOSPITAL. (114 Beds.) BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required immediately. Post recognised for F.R.C.S. and approved for pre-registration purposes.

Applications to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

ASCOT, BERKSHIRE. HEATHERWOOD ORTHOPÆDIC HOSPITAL. (200 Beds.) ORTHOPÆDIC HOUSE SURGEON (2 posts). Applications are invited from suitably qualified candidates for existing resident vacancies. Hospital is a regional centre for all general orthopædic conditions, including fractures, and performs a large amount of outpatient work.

Applications, giving full details with names of 2 referees, to Secretary.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (pædiatrics) required at Ashton-under-Lyne General Hospital. Modern Pædiatric and Premature-baby Units. Recognised for D.C.H.

Applications, with copies of 2 references, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (pædiatrics) required at Ashton-under-Lyne General Hospital. Neonatal experience would be especially valuable. Modern Pædiatric and Premature-Baby Units. Recognised for D.C.H. Vacant 1st May, appointment limited to 4 years.

Applications, with copies of 2 references, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

AYRSHIRE HOSPITALS. Following pre- or post-registration posts now vacant:—

Ayr County Hospital

HOUSE OFFICER (surgical).

HOUSE OFFICER (orthopædics).

Posts offer wide experience under Consultant supervision.

Apply immediately Area Medical Superintendent, Ballochmyle Hospital, Mauchline. (Tel. Catrine 281.)

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) SENIOR HOUSE OFFICER required, whose duties will be mainly casualty. The post is tenable for 1 year, and will be vacant in early June. Small furnished flat available.

Applications to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BEBINGTON, CHESHIRE. CLATTERBRIDGE HOSPITAL. CENTRAL WIRRAL GROUP. HOUSE OFFICER (general surgery). Recognised pre-registration. Required immediately for approximately 6 months. Salary according to previous posts held.

Application forms, from Secretary, to be returned immediately.

BECKENHAM HOSPITAL, Kent. (100 Beds.) House PHYSICIAN required at above Hospital 1st May. Pre-registration post.

Apply, stating age, qualifications and experience, and naming 3 referees, to Administrative Officer.

BECKENHAM HOSPITAL, Kent. House Surgeon required at above Hospital 1st May. Recognised for F.R.C.S. Pre-registration post, with continuity for further 6 months in House Physician post, subject to satisfactory service.

Apply, stating age, qualifications and experience, and naming 3 referees, to Administrative Officer.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. ASSISTANT PATHOLOGIST (Senior House Officer grade) required for Area Laboratory. Offers experience in all branches of pathology.

Detailed applications to Group Secretary.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. The resident appointment of HOUSE SURGEON to the Surgical Professorial Unit, Queen Elizabeth Hospital is available for a period of 3 months commencing 7th April, 1958, and ending 6th July, 1958.

Forms of application may be obtained from the Secretary, The United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him as soon as possible.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE BIRMINGHAM AND MIDLAND HOSPITALS FOR WOMEN (incorporating the Hospital for Women and the Birmingham Maternity Hospital), Showell Green-lane, SPARKHILL, BIRMINGHAM, 11. Applications are invited for the post of RESIDENT OBSTETRICAL AND GYNÆCOLOGICAL REGISTRAR, vacant 1st July, 1958. The successful candidate will be required to alternate duty at the Hospital for Women and the Maternity Hospital, for specified periods. The post is recognised for the M.R.C.O.G., and applicants should have held House appointments and at least 1 obstetrical and gynæcological post.

Forms of application may be obtained from, and should be returned not later than 23rd April, 1958, to, the House Governor at the above address. G. A. PHALP, Secretary.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the non-resident post of SENIOR HOUSE OFFICER or REGISTRAR in Pædiatrics—grading according to experience—for duties at the Birmingham Maternity Hospital, Loveday-street, and the Maternity Department of the Queen Elizabeth Hospital. Previous experience, resident, in a Children's Hospital is essential, and candidates should hold the D.C.H., or other higher qualifications. Post vacant 1st August, 1958.

Applications, stating age, nationality, qualifications, and previous appointments, should be forwarded to the House Governor, Birmingham and Midland Hospitals for Women, Showell Green-lane, Birmingham, 11, not later than 30th April, 1958.

BIRMINGHAM, 9. LITTLE BROMWICH GENERAL HOSPITAL. RESIDENT MEDICAL OFFICER in Infectious Diseases (Senior House Officer grade). Hospital serves a wide area and gives opportunities for the study of infectious diseases, and has a poliomyelitis respiratory unit. Part of the hospital is being developed as a general hospital, where further experience can be gained.

Apply, Physician-Superintendent with 2 testimonials.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Stoke-on-Trent Group, Princes-road, Stoke-on-Trent**

REGISTRAR (anæsthetics). North Staffordshire Royal Infirmary (455 Beds). Whole-time. Resident/non-resident. Possibility of housing accommodation. Higher qualification desirable. Recognised for D.A. and F.F.A. R.C.S. Medical library available.

(2) **Coventry No. 20 Group. Coventry and Warwickshire Hospital, Coventry**

(*a*) REGISTRAR (anæsthetics). Coventry and Warwickshire Hospital, Coventry. Experience specialty essential. Recognised F.F.A. R.C.S. Resident.

(*b*) REGISTRAR (orthopædic surgery). Hospital of St. Cross, Rugby (156 Beds). Some experience of traumatic surgery essential. Recognised F.R.C.S. Married accommodation available if required.

(3) **Wolverhampton Group, The Royal Hospital, Wolverhampton**

(*a*) REGISTRAR (orthopædics and traumatic surgery). The Royal Hospital, Wolverhampton. All types of traumatic and orthopædic conditions, also industrial work and rehabilitation which is carried out at a special unit of 60 Beds. Married quarters available.

(*b*) REGISTRAR (general medicine). New Cross Hospital, Wolverhampton (634 Beds). Resident post. Married quarters available.

(4) **St. Margaret's Group, Great Barr Park, Birmingham, 22a**

REGISTRAR (mental deficiency). St. Margaret's Group (1470 Beds). Whole-time. Experience specialty/high qualification desirable. Hospital recognised for D.P.M. Resident/non-resident.

(5) **West Bromwich Group, Edward-street, West Bromwich**

REGISTRAR (medical neurology) preferably resident. Midland Centre for Neurosurgery, Smethwick (75 Beds). Post provides excellent experience for candidates for higher qualifications.

Application forms from Group Secretaries, to be returned by 14th April, 1958.

BIRMINGHAM, 29. SELLY OAK HOSPITAL. (Equipped Beds 1033.) 2 HOUSE PHYSICIANS (resident). 4-month appointments.

Applications, giving age, qualifications and experience, to Medical Superintendent.

BIRMINGHAM. SOLIHULL HOSPITAL. House Surgeon (pre-registration).

Applications, stating age, qualifications and names of referees, to Medical Superintendent, Solihull Hospital, Lode-lane, Solihull, immediately.

BLACKBURN. ROYAL INFIRMARY. (262 general beds.) BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER or SENIOR HOUSE OFFICER (casualty and orthopædics) required 26th May, 1958. Junior Hospital Medical Officer post can be for any period up to 4 years. Recognised for F.R.C.S.

Apply to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BRADFORD ROYAL INFIRMARY. Resident Senior HOUSE OFFICER (medicine and pathology). This post is of a supervisory nature in 2 acute general medical wards with a Junior House Officer, combined with duties in the Department of Pathology. Vacant now.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to the Secretary.

BRADFORD ROYAL INFIRMARY, Bradford. (507 Beds.) Locum SENIOR HOUSE OFFICER (general medicine and clinical pathology). Vacant 1st April.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to Secretary, Royal Infirmary, Bradford.

BRADFORD, YORKSHIRE. THE ROYAL EYE AND EAR HOSPITAL. (105 Beds.) SENIOR HOUSE OFFICER required for Ear, Nose, and Throat Department of 56 Beds. Recognised for D.L.O. and F.R.C.S. Post vacant 27th May, 1958. Salary £819 10s. p.a., less £150 p.a. residential emoluments.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to the Secretary, Royal Infirmary, Bradford, 9.

BOLTON. THE ROYAL INFIRMARY. (236 Beds.) Senior HOUSE OFFICER (resident or non-resident) for Casualty Department with some orthopædic duties. Vacant 7th April. Recognised for F.R.C.S. Staff of 2 with Consultant supervision and adequate relief. Post offers good casualty/accident experience.

Applications, stating age, nationality, qualifications, experience and the names of 2 referees, should be sent to Group Secretary, Bolton and District Hospital Management Committee, The Royal Infirmary, Bolton.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) RESIDENT ANÆSTHETIST (Senior House Officer grade) required for 1 year with interchange of duties, by agreement, at the Brighton General Hospital and other specialised units within the Brighton and Lewes Group. Vacant 1st May. Post recognised for F.F.A. R.C.S., and D.A.

Applications, stating age, nationality and experience, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) HOUSE SURGEON required beginning of May. Pre-registration and recognised for F.R.C.S.

Applications, stating usual particulars, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRISTOL. COSSHAM AND FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. Applications invited for appointment of RESIDENT ANÆSTHETIST at Frenchay Hospital (542 Beds). Appointment will be made in either House Officer or Senior House Officer grade according to successful candidate's qualifications and experience. Position offers experience in general, neuro, plastic, and thoracic surgery. Post normally resident but applications for non-resident appointment can be considered. Vacant mid-May, tenable initially for 1 year.

Applications, naming 2 referees, to the Group Secretary, Frenchay Hospital, Bristol, by 10th April, 1958.

CAMBRIDGE. PAPWORTH HOSPITAL. Papworth HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in modern Thoracic Surgical Unit at above Hospital. The Unit, which contains the most up-to-date surgical and X-ray equipment, provides experience in the wide range of cardiac and pulmonary surgery.

Applications, giving details of previous experience, age, &c., together with names of referees, should be addressed to the Secretary, Papworth Hospital Management Committee, Papworth Hall, Cambridge.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) GYNÆCOLOGICAL HOUSE SURGEON required at Highland Court Annexe, a unit of 25 gynæcological beds situated 3 miles from the above Hospital, with all ancillary services available. Recognised for M.R.C.O.G. 6 months' appointment. Post now vacant. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) The post of SENIOR HOUSE PHYSICIAN is now vacant at Stodmarsh Road Annexe. Duties include care of 30-Bedded unit of chest diseases, also work at the Chest Clinic and with the Pneumoconiosis Unit. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) The post of PÆDIATRIC HOUSE PHYSICIAN, recognised for D.C.H., includes work in the ward and Outpatient Department and also provides experience in the care of the newborn. Opportunities exist for the study of preventive medicine among children, and child guidance work. Post now vacant. National Health Service salary and conditions.

Applications, together with copies of 2 testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) The post of GENERAL SURGICAL AND UROLOGICAL HOUSE SURGEON (pre-registration or third post), which is recognised for the F.R.C.S., is now vacant. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botleys Park War Hospital). (430 Beds.) ORTHOPÆDIC HOUSE SURGEON (Senior House Officer or House Officer (intern) grade). 100 orthopædic beds. Post recognised for F.R.C.S. and pre-registration service. Salary in accordance with terms and conditions of National Health Service. Post vacant 21st April, 1958.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, Chertsey, Surrey.

CHICHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. RESIDENT REGISTRAR in Anæsthetics. Appointment, for 1 year (renewable), vacant 1st June, 1958. Duties chiefly at the Royal West Sussex and St. Richard's Hospitals. Recognised for F.F.A. R.C.S. Salary (Whitley terms and conditions) £935 first, £1061 10s. second year, less £170 p.a. for residence. National Health Service superannuation scheme. Hospitals may be visited.

Application forms, from Group Secretary, 174, Broyle-road, Chichester, Sussex, to be returned within 14 days.

CARDIFF HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (surgical) required at Rookwood Hospital.

Form of application from Group Secretary, 44, Cathedral-road, Cardiff.

CARDIFF HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (resident) in Obstetrics and Gynæcology required from 1st May, 1958. Duties initially at Cardiff Isolation Hospital (Gynæcology) then at St. David's Hospital (Maternity). Recognised for M.R.C.O.G.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARLUKE, LANARKSHIRE. LAW HOSPITAL. (790 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (medical).

Applications, stating age, qualifications and previous experience, together with the names of 2 referees, should be sent to the Group Medical Superintendent.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for :—

Black Notley Hospital, Braintree, Essex. (522 Beds)

Post of HOUSE OFFICER (orthopædic surgery). Duties include care of cases from London Hospital Orthopædic Department. First, second, third or pre-registration post, tenable for 6 months. Recognised for F.R.C.S.

Post of Locum Tenens HOUSE SURGEON. Required immediately. First, second, third or pre-registration post. Includes duties in general surgical and gynæcological wards. Recognised for F.R.C.S.

Harwich and District Hospital, Dovercourt, Essex. (30 Beds)

Post of SENIOR HOUSE OFFICER. Duties include medical, surgical and casualty work.

St. Mary's Hospital, Pope's-lane, Colchester

Post of SENIOR HOUSE OFFICER (resident medical officer) for Geriatric Unit, includes duties in connection with medical and surgical patients accommodated at hospital and duties at Essex County Hospital (general medical). Post tenable for 6 or 12 months. Resident.

Applications, with copies of 3 testimonials, to Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

CUCKFIELD HOSPITAL, Cuckfield, near Haywards HEATH, SUSSEX. RESIDENT JUNIOR HOUSE SURGEON (general surgery). Pre-registration post now vacant. Tenable 6 months. Health Service conditions.

Applications, stating age, nationality, qualifications and experience, with names of 2 referees, to Group Secretary, Mid-Sussex Hospital Management Committee.

CUCKFIELD HOSPITAL, Cuckfield, near Haywards HEATH, SUSSEX. RESIDENT SENIOR HOUSE OFFICER (general surgery). Post, recognised for Fellowship, now vacant. Tenable 6 months in the first instance.

Applications, stating age, qualifications, nationality and experience, with names of 2 referees, to Group Secretary, Mid-Sussex Hospital Management Committee.

DONCASTER ROYAL INFIRMARY. Applications are invited for the post of SENIOR HOUSE OFFICER in Ophthalmology. Recognised for D.O.

Applications, with particulars of experience and copies of 2 recent testimonials, to the Group Secretary, Doncaster Hospital Management Committee, at Doncaster Royal Infirmary.

DONCASTER ROYAL INFIRMARY. (330 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST in the grade of Senior House Officer. Post recognised under the regulations for the F.F.A. R.C.S. and D.A.

Applications to the Group Secretary, Doncaster Hospital Management Committee, at Doncaster Royal Infirmary.

EAST GRINSTEAD. QUEEN VICTORIA HOSPITAL. RESIDENT HOUSE OFFICER (Male or Female), Locum or permanent appointment, required immediately for General Hospital. Appointment for 6 months in first instance; recognised for pre-registration purposes, and for F.R.C.S. examination.

Apply, stating age and experience, with names of 3 referees, to Hospital Secretary.

EDINBURGH. PRINCESS MARGARET ROSE ORTHOPÆDIC HOSPITAL. Applications are invited from registered medical practitioners for appointments as SENIOR HOUSE OFFICERS (resident) in the adult and children's wards of the above hospital for vacancies arising in April, May, and June, 1958. National Health Service scale.

Applications, stating age, qualifications and experience, and the names of 2 referees, and preference for adult or children's work, to be sent immediately to the Secretary, Edinburgh Central Hospitals, 1, Rillbank-terrace, Edinburgh, 9.

GLOUCESTER. HORTON ROAD AND CONEY HILL HOSPITALS. (1540 Beds.) Applications invited for the appointment of a JUNIOR HOSPITAL MEDICAL OFFICER. Hospitals serve the North Gloucestershire Clinical Area, including Gloucester, Cheltenham, Stroud, and Forest of Dean. High admission-rate (850). All modern methods of treatment. New units provide for treatment of neurosis and alcoholism. Expanding outpatient services, day-hospital, long-stay annexes and social clubs. Encouragement and opportunity for study. Salary and conditions Whitley Council.

Applications, with names of 3 referees, to Physician-Superintendent.

HALIFAX. NORTHOWRAM HALL HOSPITAL. (108 Beds.) SENIOR HOUSE OFFICER in Chest Diseases required. Post vacant, mid-April, 1958. Duties include attendance at busy Chest Clinic at the Royal Halifax Infirmary and non-tuberculous chest ward work. This post offers excellent facilities for the study of chest diseases and experience is available with bronchoscopies and bronchograms. Salary £819 10s. p.a., with a deduction of £150 p.a. for board residence, &c.

Applications to be forwarded to the Group Secretary, Royal Halifax Infirmary, Halifax.

HASTINGS AND ST. LEONARDS-ON-SEA. BUCHANAN HOSPITAL. (91 Beds.) Locum SENIOR HOUSE OFFICER (obstetrics) required 14th–27th April inclusive. Salary £15 19s. a week, less board.

Apply, with names of 2 referees, to Hospital Administrator.

HASTINGS. ST. HELEN'S HOSPITAL. (493 Beds.) HOUSE SURGEON required. Pre-registration post, recognised for F.R.C.S. Modern theatre. Staff of 5.

Applications to Hospital Administrator.

HEMEL HEMPSTEAD, HERTFORDSHIRE. ST. PAUL'S HOSPITAL. HOUSE PHYSICIAN (pre-registration) required immediately.

Applications to the Hospital Secretary, together with 2 copies of testimonials.

HENLEY-ON-THAMES, OXFORDSHIRE. PEPPARD CHEST HOSPITAL. (236 Beds.) READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of JUNIOR HOSPITAL MEDICAL OFFICER, vacant 13th April, 1958. The Hospital deals with all types of chest disease in medical and surgical wards. Previous experience in resident hospital appointments is desirable. Single accommodation is available.

Applications, stating age, qualifications and experience, with the names of 2 referees, should be forwarded to the Group Secretary, Reading and District Hospital Management Committee, 3, Craven-road, Reading.

HEREFORD COUNTY HOSPITAL. (341 Beds.) House OFFICER (surgery) required immediately. Pre-registration post. Hospital recognised for F.R.C.S.

Applications, with copies of 2 recent testimonials, to Medical Superintendent, County Hospital.

HEREFORD. COUNTY HOSPITAL. (341 Beds.) Locum HOUSE OFFICER (surgery) required immediately for period up to but not exceeding 6 weeks.

Applications to be addressed to Medical Superintendent, County Hospital.

HEREFORD GENERAL HOSPITAL. (154 Beds.) House OFFICER (general surgery) required immediately. Pre-registration post. Hospital recognised by R.C.S. Duties include care of general surgical beds and in addition for 3 months of orthopædic beds and for 3 months of E.N.T. beds.

Applications, with copies of 2 testimonials, to be sent to the Group Secretary, Victoria House, Eign-street, Hereford.

HITCHIN, HERTFORDSHIRE. LISTER HOSPITAL. RESIDENT HOUSE SURGEON post now vacant. Recognised as pre-registration post and for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Medical Administrator, Lister Hospital.

HITCHIN, HERTFORDSHIRE. NORTH HERTS HOS-PITAL. Applications are invited for the post of RESIDENT HOUSE SURGEON, vacant 1st May, 1958. Recognised for the F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Medical Administrator, Lister Hospital, Hitchin.

HOLT, NORFOLK. KELLING HOSPITAL AND DEPARTMENT OF THORACIC SURGERY. Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER, vacant now. This Hospital (180 Beds) deals with tuberculous and non-tuberculous chest conditions and offers excellent experience in chest medicine and thoracic surgery. Married accommodation available.

Applications, stating age, sex, qualifications, nationality and experience, together with names of 2 referees, to the Group Secretary, Cromer Area Hospital Management Committee, Cliff-avenue, Cromer, Norfolk, who will be pleased to supply any other information concerning the appointment.

HOVE GENERAL HOSPITAL. Pre-registration House SURGEON (with ward and casualty duties) required immediately for a period of 6 months. This post is recognised for the F.R.C.S. and provides a wide experience in an active surgical unit.

Applications, stating age, qualifications, and full details of experience, together with the names and addresses of 2 referees, to the Administrative Officer, Hove General Hospital, Hove, Sussex.

HULL A GROUP HOSPITAL MANAGEMENT COM-MITTEE. Locum HOUSE PHYSICIAN, Pædiatric Unit, required for June and July, 1958. Duties mainly at the Western General Hospital, but some duties at the Victoria Children's Hospital.

Apply, giving experience, testimonials, &c., to the Hospital Secretary, Victoria Hospital for Sick Children, Park-street, Hull.

HUDDERSFIELD. ST. LUKE'S HOSPITAL. (235 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Senior House Officer grade) at the above Hospital, to commence duties immediately. The duties will be mainly surgical, in a hospital which caters for chronic sick, children, maternity, and acute medical and surgical patients. Salary in accordance with the terms and conditions of service for hospital medical and dental staff, £819 10s. p.a.

Applications, together with copies of 3 recent testimonials, to be sent to the undersigned as soon as possible.

H. J. JOHNSON,
Secretary to the Management Committee.
The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON,
Secretary to the Management Committee.
The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) Applications are invited for the post of CASUALTY OFFICER. The post, which is resident, is recognised under the Fellowship regulations and will be graded either Junior Hospital Medical Officer or Senior House Officer according to experience. Duties terminate at 7 P.M. with 1 night weekly on call.

Applications for the appointment, which will be vacant on 22nd April, 1958, should be accompanied by copies of 3 recent testimonials and addressed to the undersigned.

H. J. JOHNSON, Group Secretary.
The Royal Infirmary, Huddersfield.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgical), vacant on 15th April. Post recognised for pre-registration purposes.

Apply, with full particulars and names of 2 referees, to Secretary, County Hospital, Huntingdon.

ILKLEY. MIDDLETON HOSPITAL. (430 Beds.) Resident SENIOR HOUSE OFFICER (surgical) required for Major Thoracic Surgical Unit at the above Hospital.

Applications, stating age, nationality, qualification and experience, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) RESIDENT ANÆSTHETIST (Senior House Officer grade) required from 14th April to 14th May, 1958.

Applications, with copy testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Heath-ROAD WING), IPSWICH. Pre-registration post of HOUSE SURGEON to General Surgeon vacant. Recognised for R.C.S. examination.

Applications, with copies of recent testimonials, to Hospital Secretary.

KETTERING AND DISTRICT GENERAL HOSPITAL, NORTHAMPTONSHIRE. Applications are invited for the post of Locum HOUSE SURGEON (pre-registration), from 1st April for 2 months. Post recognised for F.R.C.S.

Applications, stating age, experience, and qualifications, together with copies of 3 recent testimonials, to be sent to the Group Secretary at the above address.

KIDDERMINSTER AND DISTRICT GENERAL HOS-PITAL, WORCESTERSHIRE. (112 Beds.) Applications are invited for the pre-registration post of Locum HOUSE SURGEON at the above Hospital. Post vacant now.

Applications, with the names of 3 referees, to the Hospital Secretary.

LLANELLY HOSPITAL, Llanelly. Glantawe Hospital MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the resident appointment of JUNIOR HOSPITAL MEDICAL OFFICER in the Medical Unit of the above Hospital.

Applications, stating age, experience and qualifications, together with copies of 2 recent testimonials, should be sent to the Secretary of the Hospital.

T. E. JONES, Group Secretary.

LLANELLY. BRYNTIRION HOSPITAL. (156 Beds.) GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the temporary post of JUNIOR HOSPITAL MEDICAL OFFICER for work in the Chronic Sick Wards of the above Hospital. The post will be for a period of 6 to 12 months. Accommodation is available for a single person.

Applications, stating age, experience and qualifications, together with copies of 2 recent testimonials, should be addressed to the undersigned at Glantawe Hospital Management Committee, St. Helen's-road, Swansea.

T. E. JONES, Group Secretary.

LEICESTER ROYAL INFIRMARY. Applications are invited for the 3 resident posts of HOUSE SURGEON or SENIOR HOUSE OFFICER. Available for pre-registration candidates. Now vacant. Recognised for the F.R.C.S.

Applications, stating age and qualifications, together with copies of recent testimonials, to the Group Secretary, The Leicester No. 1 Hospital Management Committee, The Leicester Royal Infirmary, forthwith.

LEICESTER. TOWERS MENTAL HOSPITAL. (1168 Beds.) Applications are invited for the Whole-time post of JUNIOR HOSPITAL MEDICAL OFFICER. Salary £852 10s.–£55–£1182 10s. There is ample opportunity for experience in all branches of psychiatry including outpatient work, and the Hospital is recognised for D.P.M. experience. Facilities for postgraduate training exist at Sheffield University. Resident accommodation is available for a single man or woman, for which the appropriate charge will be made. Candidates must have completed their service with H.M. Forces.

Applications, giving age, nationality, and full details, with the names of 2 referees, to be sent to the Medical Superintendent as soon as possible.

LEEDS REGIONAL HOSPITAL BOARD. Short-term LOCUM TENENS appointments in the Registrar grade are constantly available at hospitals in the area of the Board, particularly in the specialties of anæsthetics, general medicine, general and orthopædic surgery, and psychiatry.

Interested practitioners, suitably experienced, should communicate with the Secretary, Joint Registrars Committee, Park-parade, Harrogate.

LEEDS. THE UNITED LEEDS HOSPITALS. THE GENERAL INFIRMARY AT LEEDS. SENIOR REGISTRAR in Ophthalmology required.

Applications, giving details of age, qualifications, previous posts with dates, and 3 names for reference, to be sent to the Sub-Dean, School of Medicine, Leeds 2, by not later than 12th April, 1958.

LEEDS, 7. CHAPEL ALLERTON HOSPITAL. (228 Beds.) SENIOR HOUSE OFFICER (medical) required. National Health Service terms and conditions.

Apply Medical Superintendent.

LINCOLN. ST. GEORGE'S HOSPITAL. (242 Beds.) LINCOLN NO. 1 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE PHYSICIAN at the above Hospital, vacant from 1st May. Duties include acute medical, acute chest and pædiatrics.

Applications, giving full particulars and names for reference, should be addressed to the Secretary.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. LIVERPOOL ROYAL INFIRMARY. Applications are invited for temporary appointment to the resident post of JUNIOR CASUALTY OFFICER (Senior House Officer grade) for the period to 30th September, 1958.

Apply by 19th April, 1958, on form obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. LIVERPOOL REGIONAL HOSPITAL BOARD. Applications are invited for temporary appointment to the post of REGISTRAR in Pathology for duty at the Liverpool Stanley Hospital, Bootle Hospital, and Waterloo Hospital for the period to 30th September, 1958. The person appointed will be eligible to apply in the summer for appointment for the year beginning 1st October, 1958.

Apply by 19th April on form obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LOUGHBOROUGH GENERAL HOSPITAL. Applications are invited for the resident post of HOUSE SURGEON or SENIOR HOUSE OFFICER (surgical, Female), available for pre-registration candidates, vacant early June.

Applications, stating age, qualifications and experience, with copies of recent testimonials, to the Group Secretary, Leicester No. 1 Hospital Management Committee, The Leicester Royal Infirmary, forthwith.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON. 6 months' appointment. Vacant now. Recognised for F.R.C.S. Salary at the rate of £467 10s.–£577 10s. p.a. A deduction at the rate of £125 a year is made for board and lodging, and other services provided.

Applications should be forwarded, as soon as possible, to the Administrative Officer at the Hospital.

MANCHESTER, 8. CRUMPSALL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER to the Psychiatric Department at the above General Hospital. Now vacant. This department offers experience in all branches of psychiatric illness, including all modern methods of treatment, and a modern electroencephalographic department is available for diagnostic work. The post is recognised for the diploma in Psychiatric Medicine. Experience not essential. The Unit has 26 available beds.

Applications, with names of 2 referees, by 14th April, 1958, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

MANCHESTER (near). PRESTWICH (MENTAL) HOSPITAL. JUNIOR HOSPITAL MEDICAL OFFICER and SENIOR HOUSE OFFICER (2 posts) required at above Hospital. Single quarters available; all modern treatments practised and study facilities granted.

Applications, giving full personal details and the names and addresses of 2 referees, should be sent to the Medical Superintendent, Prestwich Hospital, P.O. Box No. 1, Prestwich, Manchester, not later than Saturday, 12th April, 1958.

MANCHESTER. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics) with duties in the South Manchester Group. This post is recognised by the Royal College of Surgeons for the F.F.A. R.C.S. and for the D.A.

Applications, stating age, present post, experience and the names of 2 referees, to be forwarded immediately to the Group Secretary, Withington Hospital, Manchester, 20.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER to the Geriatric Department which will become vacant on 1st June, 1958. Resident or non-resident. Duties are primarily in the active medical wards. Excellent experience is available in the unit which has been developed on modern lines and has available full general hospital facilities.

Applications, stating age, qualifications, present post, experience, and the names of 2 referees, to be forwarded to the Group Secretary at the Hospital immediately.

MIDDLESBROUGH GENERAL HOSPITAL. Ayresome Green-lane, MIDDLESBROUGH. (305 Beds.) TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (orthopædics) at the above Hospital. The post is recognised for the F.R.C.S. examination and will include some duties in the Casualty Department, which is under the supervision of a full-time Senior Casualty Officer.

Applications, stating age, qualifications and experience, together with the names of 2 referees, should be sent to the Hospital Secretary.

MIDDLESBROUGH GENERAL HOSPITAL, Ayresome Green-lane, MIDDLESBROUGH. (305 Beds.) TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE OFFICER (orthopædics) at the above Hospital. The post is recognised for pre-registration service under the Medical Act, 1950, and includes some duties in the Casualty Department which is under the supervision of a full-time Casualty Officer.

Applications, stating full details and giving 2 names for reference, should be sent to the Hospital Secretary.

MIDDLESBROUGH (near). HEMLINGTON HOSPITAL. TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (surgery) at the above Hospital. This post offers experience in acute surgery, gynæcology, and plastic surgery.

Applications, stating age, qualifications and names for reference to be forwarded to the Hospital Secretary.

MIDDLESBROUGH. NORTH ORMESBY HOSPITAL. (184 Beds.) TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (surgery) for Surgical Team No. 2 at the above Hospital. The post is recognised for pre-registration service under the Medical Act, 1950.

Applications, stating full details and giving 2 names for reference, should be addressed to the Hospital Secretary as soon as possible.

MACCLESFIELD HOSPITAL. (300 Beds.) Senior House OFFICER in Pathology, resident or non-resident if near Hospital. Experience offered in all branches, the position gives opportunity for study for medicine; also recognised for D.Path. Vacant early April.

Apply, with names and addresses of 2 referees, to Group Secretary, Macclesfield and District Hospital Management Committee, Willerby House, Cumberland-street, Macclesfield.

NEATH GENERAL HOSPITAL, Neath. (412 Beds.) MID GLAMORGAN HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (traumatic surgery and casualty). This Hospital is recognised for the F.R.C.S.

Applications, naming 2 referees, to be addressed to the Group Secretary of the Committee, 8, Wind-street, Neath.

NEWARK GENERAL HOSPITAL. Nottingham No. 1 HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (medical) required for above Hospital situated on Great North-road, approximately 20 miles from Nottingham. Post offers good experience. Consultant staff attending Newark Hospital are on 1 or more of the Nottingham Hospitals. Flat available as married quarters. Salary and conditions of service in accordance with Ministry regulations. Duties to commence about 29th April, 1958.

Applications, giving names of 3 referees, should be sent to Group Secretary, Nottingham No. 1 Hospital Management Committee, General Hospital, Nottingham.

NEWCASTLE GENERAL HOSPITAL. Newcastle upon TYNE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (general surgery), resident. Recognised for F.R.C.S. Diploma.

Applications, together with names and addresses of 2 referees, should be sent to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regis-TRAR SURGEON, whole-time for Surgical Clinic No. 2. Tees-side Group of hospitals—main hospitals North Ormesby (180 Beds), Hemlington (198 Beds). Post recognised for F.R.C.S. Single accommodation available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. West CUMBERLAND GROUP OF HOSPITALS. 2 REGISTRARS in Obstetrics and Gynæcology, 1 to be based at Workington Infirmary (42 obstetric beds, 13 gynæcology beds) and the other at Whitehaven Hospital (17 obstetric beds, 13 gynæcology beds). Each appointment will be held for 1 year in the first instance with likelihood of extension.

Applications to Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 14 days.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. BOARD OF GOVERNORS AND REGIONAL HOSPITAL BOARD. Reciprocal Training Scheme for Senior Registrars. Applications are invited for the non-resident whole-time post of SENIOR SURGICAL REGISTRAR tenable at the Royal Victoria Infirmary. The appointment will be for 1 year in the first instance and may be renewed to a maximum of 4 years. In any reappointment the successful candidate will be required to spend 1 year in a selected hospital of the Newcastle Regional Hospital Board in accordance with an agreement between the two Boards. The appointment will be subject to the terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle-upon-Tyne.

NEWMACHAR, ABERDEENSHIRE. KINGSEAT HOS-PITAL. Applications are invited from Male or Female doctors for the post of REGISTRAR in the above modern Mental Hospital of 810 Beds. Residential accommodation available for married or single applicant, if required. Facilities for study for D.P.M. available and close association with the University Department of Mental Health. Post tenable for 1 year in first instance, and National Health Service conditions apply.

Applications, with age, full details of experience, &c., and names of 2 referees, to be lodged with Secretary, Aberdeen Mental Hospitals, 62, Queen's-road, Aberdeen, within 14 days of this advertisement.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOS-PITAL. ANÆSTHETIC REGISTRAR required by middle of June. Duties to be divided equally between the Plastic Centre and the General Hospital, and will include routine and emergency work. Candidates should be working for, or in possession of, the higher qualifications in anæsthesia.

Application forms obtainable from and returnable to the Group Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middlesex, by 16th April, 1958.

NEWTON ABBOT HOSPITAL. (General section, 65 Beds.) RESIDENT SENIOR HOUSE SURGEON, Male or Female, required approximately end May, 1958. Married quarters available.

Applications, quoting Ref. F.364/40, stating qualifications, nationality, age, with copy testimonials, to be sent to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, South Devon.

NOTTINGHAM CITY HOSPITAL AND SKIN CLINIC. SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT REGISTRAR (dermatology) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 14th April, 1958, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM EYE HOSPITAL. Senior House Officer required, duties to commence mid-April, 1958. Salary and conditions of service in accordance with Ministry regulations.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

OXFORD REGIONAL HOSPITAL BOARD. Registrar in Pædiatrics to the hospitals of the Aylesbury, High Wycombe, and Amersham area based on Stoke Mandeville Hospital. Residence optional. The appointment will be for 1 year, eligible for extension to a second year.

Applications on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, to reach him by 16th April.

OXFORD REGIONAL HOSPITAL BOARD. Registrar in Psychiatry to St. Crispin Hospital, Duston, Northampton (1100 Beds). Single accommodation. Post vacant now. Good training facilities, including Electroencephalograph Department and child guidance work.

Applications, on forms obtainable from the Secretary, Registrars Committee, 43, Banbury-road, Oxford, should reach him by 19th April.

OXFORD. UNITED OXFORD HOSPITALS. Department of Pædiatrics. Applications invited for the post of NON-RESIDENT REGISTRAR at the Churchill Hospital, to commence early in July. Pædiatrics and neonatal.

Application forms are obtainable from the Administrator, Radcliffe Infirmary, Oxford, and should be received not later than 30th April, 1958.

OXFORD. UNITED OXFORD HOSPITALS. Applications are invited for the post of RESIDENT JUNIOR PATHOLOGIST for 6 months at the Radcliffe Infirmary and Churchill Hospital, Oxford. The post is graded at Senior House Officer rate, £819 10s. p.a., and will be vacant with effect from 12th May, 1958.

Applications, stating age, qualifications and experience, together with the names of 2 referees, to the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 18th April, 1958.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL GENERAL HOSPITAL GROUP. Department of Obstetrics and Gynæcology. RESIDENT OBSTETRICAL AND GYNÆCOLOGICAL OFFICER for 1 year in the first instance; salary £935. Renewable for a second year; salary £1061 10s. Vacant 9th June, 1958. Recognised for the M.R.C.O.G.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to the Group Secretary, 7, Nelson-gardens, Devonport, not later than 26th April, 1958.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, FREEDOM FIELDS. Central Casualty Department. RESIDENT SENIOR HOUSE OFFICER in Casualty, vacant immediately. Recognised for the F.R.C.S.

Applications, with names of 3 referees, to be sent to the Group Secretary.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. SENIOR HOUSE OFFICER in Medicine, vacant 11th June, 1958.

Applications, with names of 3 referees, to Group Secretary, 7, Nelson-gardens, Devonport.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, Greenbank-road. HOUSE SURGEONS, pre-registration posts, vacancies 1st and 6th June, also 1st July, 1958. Recognised for the F.R.C.S.

Applications, with full particulars, to the Group Secretary.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE. (336 Beds and large Outpatient Department. Committee's Base Hospital serving population of 174,000. Recognised for D.Obst.R.C.O.G., F.R.C.S., D.C.H., F.F.A. R.C.S., D.A.) PONTYPRIDD AND RHONDDA HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (surgery).

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent immediately to the Group Secretary, Courthouse-street, Pontypridd.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

(1) **Saint Mary's Hospital**

HOUSE SURGEON (pre-registration). Vacant now (2 posts).

(2) **Royal Portsmouth Hospital**

(*a*) HOUSE SURGEON (pre-registration). Vacant now.

(*b*) SENIOR HOUSE OFFICER required in Orthopædic Department (104 Beds). Vacant now.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

St. Mary's Hospital, Milton-road, Portsmouth.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (620 Beds.) Locum REGISTRAR required for the Chest Unit at the above Hospital and Lancaster House Chest Clinic on a month-to-month basis pending appointment being filled by the Regional Hospital Board.

Apply immediately to the Secretary.

READING. BATTLE HOSPITAL. (391 Beds.) READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of RESIDENT JUNIOR HOUSE SURGEON (pre- or post-registration) required in the Accident and Orthopædic Department. F.R.C.S. recognised. Also casualty duties.

Apply, stating age, qualifications with dates, nationality, present post, with copy of recent testimonial, to Secretary.

READING COMBINED HOSPITALS. Area Department OF OBSTETRICS AND GYNÆCOLOGY. (100 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the resident post of GYNÆCOLOGICAL HOUSE SURGEON at the Royal Berkshire Hospital, Reading. Vacant 8th April, 1958, and tenable for 6 months. Post recognised for M.R.C.O.G.

Write, stating age, qualifications with dates, nationality and present post, with copy of 1 recent testimonial, to Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. Applications are invited from registered medical practitioners for the post of RESIDENT ASSISTANT PATHOLOGIST (1 of 2), vacant on 15th April, 1958, and tenable for 6 months. Salary £577 10s. p.a.

Write, stating age, qualifications with dates, nationality and present post, with copies of 2 recent testimonials, to Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (397 Beds.) Applications are invited from registered and provisionally registered medical practitioners for resident post of HOUSE SURGEON, vacant 9th April, 1958, and tenable for 6 months.

Write, stating age, qualifications with dates, nationality, present post, with copies of 2 recent testimonials, to Secretary, Royal Berkshire Hospital, Reading.

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. RESIDENT MEDICAL OFFICER (Registrar grade), post vacant 1st May, 1958, at Birch Hill Hospital, Rochdale.

Apply as soon as possible, with names and addresses of 2 referees, to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. BIRCH HILL HOSPITAL. HOUSE OFFICER (obstetrics and gynæcology) required immediately. The post is for 6 months in the first instance and is recognised for the D.Obst.R.C.O.G.

Apply, with names and addresses of 2 referees, to the Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

ROCHESTER, KENT. ST. BARTHOLOMEW'S HOSPITAL. MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of CASUALTY OFFICER (Senior House Officer grade) (1 of 2 in the department) vacant now. Salary £819 10s. p.a., post tenable for 6 months or 1 year.

Applications, stating age, nationality, qualifications and experience, with recent testimonials, to Hospital Secretary.

ROCHESTER, KENT. ST. BARTHOLOMEW'S HOSPITAL. (Recognised for the F.R.C.S.) MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON. Applications are invited for the pre-registration post which is vacant now. Salary £467 10s.–£577 10s. p.a., according to experience.

Applications, stating age, qualifications, nationality and experience, to Hospital Secretary.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. Locum ANÆSTHETIC REGISTRAR required for period of 6 months.

Apply for further particulars by letter or telephone to Medical Superintendent. Telephone Romford 46090.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (90 Beds.) RESIDENT HOUSE SURGEON (Male) required immediately. Not pre-registration appointment.

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (90 Beds.) RESIDENT HOUSE PHYSICIAN (Male) required from 21st April, 1958. Not pre-registration appointment.

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Pædiatrics. Dundee General Hospitals. Applications are invited for the post of SENIOR REGISTRAR in Pædiatrics at Dundee Royal Infirmary (534 Beds) and Maryfield Hospital, Dundee (370 Beds), the main teaching hospitals associated with the University of St. Andrews. The duties will include teaching of undergraduates. Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, Braeknowe, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 12th April.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD invite applications from qualified medical practitioners for the post of TRAINEE MEDICAL SUPERINTENDENT attached to the Regional Hospital Board. The period of training will be for 2 years and experience will be given in general hospital administration with a short period in the mental service. Salary £1000 p.a.

Further particulars and forms of application are obtainable from the undersigned, with whom pplications should be lodged by 19th April, 1958. A. M. FRASER, M.D.,

Secretary and Administrative Medical Officer.

Northern Regional Hospital Board,

Reay House, 17, Old Edinburgh-road, Inverness.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Locum REGISTRAR in Radiodiagnosis at the Royal Infirmary, Edinburgh.

Apply, giving particulars of age, qualifications and previous experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3.

SALFORD. HOPE HOSPITAL. Salford Hospital Management Committee. Applications are invited for the post of SECOND RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade) in the Group Laboratory at Hope Hospital, Salford, which is at present vacant. Post recognised for the Diploma in Pathology.

Applications, together with details of age, qualifications and the names and addresses of 2 referees, should be forwarded to the Hospital Secretary.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Board of Governors and Sheffield Regional Hospital Board. Reciprocal Training Scheme for Senior Registrars. Whole-time SENIOR REGISTRAR in Anæsthetics required with initial tenure of appointment at Nottingham City Hospital (811 Beds). Duties also at other hospitals in the Nottingham Area. Possession of a higher qualification desirable. Appointment for 1 year in first instance and renewable thereafter annually. Successful candidate will be transferred to the Teaching Hospitals for the second phase of the appointment in accordance with arrangements under the Reciprocal Training Scheme. Renewal of appointment and transfer will be subject to satisfactory work and progress.

Further details from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10. Forms to be returned by 21st April.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS Board of Governors and the Sheffield Regional Hospital Board. Reciprocal Training Scheme for Senior Registrars. Applications invited for the post of SENIOR REGISTRAR in Radiology, with initial tenure in the Department of Radiology at the Royal Infirmary/Royal Hospital, Sheffield. Candidates should hold a Diploma in Diagnostic Radiology. Appointment for 1 year in the first instance and renewable annually thereafter. The successful candidate will be transferred to a Regional hospital for the second phase of his appointment in accordance with the arrangements under the Reciprocal Training Scheme. Renewal of appointment and transfer will be subject to satisfactory work and progress.

Applications, stating age, qualifications and experience, with the names of 3 referees, to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1, not later than 12th April, 1958.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. Locum Tenens CASUALTY OFFICER (Senior House Officer) for duties in Casualty and Orthopædic Departments from 5th April to 26th April, 1958, inclusive. Non-resident (single accommodation available).

Applications to Secretary, Southlands Hospital.

A. V. Oakton, Group Secretary,
Worthing Group Hospital Management Committee.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) HOUSE SURGEON. Vacant 23rd April, 1958. Pre-registration candidates eligible. Recognised for the F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) HOUSE SURGEON. Vacant 1st May, 1958. Pre-registration candidates eligible. Recognised for the F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SOUTHALL, MIDDLESEX. ST. BERNARD'S HOSPITAL for Nervous and Mental Disorders. SENIOR HOUSE OFFICER required. Facilities are afforded junior staff to become versed in all branches of psychiatry. National Health Service salary and conditions.

Applications, giving full details and copies of 3 recent testimonials, should be sent to the Physician-Superintendent, within 14 days of the appearance of this advertisement.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (274 Beds.) RESIDENT HOUSE SURGEON required immediately. Pre-registration candidates eligible. The post is recognised for F.R.C.S. and offers exceptional opportunities for general experience with a Senior Surgical Registrar in a busy acute unit of 70 Beds.

Applications, with copies of recent testimonials, to Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHEND-ON-SEA GENERAL HOSPITAL. Applications are invited for the post of RESIDENT DEPUTY CASUALTY OFFICER (Senior House Officer grade) with duties in the Fracture and Orthopædic Department for a period of 6 months from 1st May, 1958. The post is recognised for the F.R.C.S.

Applications, stating age, qualifications and experience, with copies of recent testimonials, to reach the Secretary as soon as possible.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (815 Beds.) HOUSE OFFICER (general surgery) required. Vacant shortly. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials, to the Secretary at the Hospital.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. Applications invited for HOUSE OFFICER (medical), vacant shortly. Recognised pre-registration post.

Detailed applications to the Secretary at the Hospital.

STAFFORD. ST. GEORGE'S HOSPITAL. Senior House OFFICER and HOUSE OFFICER (resident) required. The posts offer experience in all branches of psychiatry, outpatient work, medical psychology, psychosurgery, &c. The Hospital (1238 Beds with separate unit for private patients) has a high admission-rate and is recognised for training for D.P.M., a Course for which may be taken at the University of Birmingham.

Applications, with names of 2 referees, to Medical Superintendent.

STAFFORD HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (obstetrics and gynæcology). Married accommodation available.

Applications to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE SURGEON (House Officer grade) required for 1 of the 2 surgical teams. Post recognised for F.R.C.S. Post vacant 16th April, 1958, and tenable for 6 months. Preference given to candidates seeking post under the Medical Act, 1950.

Applications to Secretary, Mid Herts. Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE PHYSICIAN (House Officer grade) required for duties mainly in the Pædiatric Department. Post vacant approximately 20th April, 1958, and tenable for 6 months. Preference given to candidates seeking pre-registration posts under the Medical Act, 1950.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS, HERTFORDSHIRE. CELL BARNES HOSPITAL. North West Metropolitan Regional Hospital Board. REGISTRAR required at above Hospital. This is a modern hospital where 895 mental defectives of all types and ages are under care. Approved for D.P.M. Good pædiatric experience available. Hospital may be visited by direct appointment.

Application forms obtainable from the Group Secretary, Harperbury Hospital, St. Albans, Herts.

STOCKPORT INFIRMARY. (163 Beds.) Applications are invited for the post of HOUSE OFFICER (general surgery), vacant 7th April, 1958. This is an approved pre-registration post and is recognised for the F.R.C.S.

Applications, with copies of 2 testimonials, to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

STOCKPORT. STEPPING HILL HOSPITAL. (529 Beds.) Stockport and Buxton Hospital Management Committee. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (anæsthetics), vacant 16th May, 1958. The post is recognised for the D.A. and F.F.A. R.C.S., and there are facilities for study.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw Heath, Stockport.

STOCKPORT. STEPPING HILL HOSPITAL. (529 Beds.) Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (surgery). Vacant 15th April, 1958. The post is recognised for the F.R.C.S.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be addressed to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw Heath, Stockport.

SWANSEA HOSPITAL, Swansea. (413 Beds.) Glantawe Hospital Management Committee. Applications are invited for the resident post of SENIOR HOUSE OFFICER in the Traumatic and Orthopædic Department of the above Hospital. The post is recognised under the F.R.C.S. regulations for 6 months' casualty training. It offers exceptional experience in all aspects of traumatic surgery as occurring in a large industrial centre and port.

Applications, stating age and experience together with copies of 2 recent testimonials, should be forwarded to the Hospital Secretary. T. E. Jones, Group Secretary.

SWINDON AND DISTRICT HOSPITAL MANAGEMENT committee. Swindon Hospitals. Applications invited for post of RESIDENT HOUSE PHYSICIAN in Acute Medical Unit of 64 Beds at St. Margaret's Hospital. Recognised for training under pre-registration internship regulations.

Full details, with names of 3 referees, to Secretary, 7, Okus-road, Swindon, immediately.

TAPLOW, near MAIDENHEAD. CANADIAN RED Cross Memorial Hospital. HOUSE SURGEON required for the Unit of Obstetrics and Gynæcology. Vacant 18th May. Post recognised for M.R.C.O.G.

Applications, stating age and qualifications with dates, together with copies of 2 testimonials, to Secretary.

TAUNTON AND SOMERSET HOSPITAL, Taunton, Somerset. Applications are invited for SENIOR HOUSE OFFICER (Resident Surgical Officer) post. Vacant early April. This is a post giving excellent experience in surgery including operating work according to qualifications and experience. The post is recognised by the Royal College of Surgeons as a qualifying appointment for Final Fellowship Examination.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, c/o Musgrove Park Hospital, Taunton, Somerset.

TUNBRIDGE WELLS (near). PEMBURY HOSPITAL, Pembury. Applications invited for appointment of SENIOR ORTHOPÆDIC HOUSE SURGEON AND CASUALTY OFFICER (Senior House Officer grade) to begin duties as soon as possible. Recognised F.R.C.S. (Eng.) and tenable for 1 year. Work includes treatment of long- and short-stay cases and traumatic surgery with large Outpatient and Fracture Clinics under 2 Consultants.

Apply, stating age, qualifications and experience, together with 3 testimonials, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

VENTNOR, ISLE OF WIGHT. ROYAL NATIONAL Hospital for Diseases of the Chest. Required, RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER. Hospital has beds for tuberculous and non-tuberculous diseases and thoracic surgery.

Applications, with names of 2 referees, to Physician-Superintendent.

TORQUAY. TORBAY HOSPITAL. Senior Resident HOUSE OFFICER (medicine) required end April, 1958. There is a complement of 6 Resident House Officers.

Applications, stating qualifications, age, nationality, with copy testimonials (quoting reference F.955/90), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

WATFORD HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (211 Beds.) ORTHOPÆDIC HOUSE SURGEON (with certain casualty duties) required. Post recognised for F.R.C.S. (Eng.) examination. The orthopædic service is in the charge of a Consultant and Registrar closely associated with a postgraduate teaching hospital.

Applications, with copies of 2 testimonials, to the Administrator.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (211 Beds.) CASUALTY OFFICER (Senior House Officer) required. Modern Department employing 3 full-time Casualty Officers including whole-time Surgeon-in-Charge. Post recognised for F.R.C.S. Resident or non-resident. Post vacant beginning of May.

Please send applications, with copies of 2 references, to the Administrator.

WATFORD. SHRODELLS HOSPITAL. Applications are invited for the post of HOUSE OFFICER (Senior House Officer grade) to the Paediatric Unit of 38 Beds. Post recognised for the D.C.H. To take up duty as early as possible.

Applications, together with copies of 2 recent testimonials, should reach the Medical Administrator as soon as possible.

WELSH REGIONAL HOSPITAL BOARD. Registrar, Psychiatry, Morgannwg Hospital, Bridgend (all modern treatments, active outpatient clinics, Child Guidance Clinic and Psychological Department). Within easy reach of University of Wales. Previous psychiatric experience not essential. Accommodation available. Subject to review annually.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WEST BROMWICH AND DISTRICT HOSPITALS MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics) required, resident. New appointment. Duties mainly at 2 general hospitals. Recognised for D.A. and F.F.A. R.C.S. The post is tenable for 1 year.

Applications with names of 3 referees to be sent to J. O. ROBINS, Group Secretary, West Bromwich and District General Hospital, Edward-street, West Bromwich.

WEST FIFE HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics) (resident) at the Dunfermline and West Fife Hospital. The appointment will be for the period of 1 year in the first instance and the person to be appointed will be expected to take up duties about 23rd June, 1958. The Dunfermline and West Fife Hospital is a busy general surgical unit, recognised by the Faculty of Anæsthetists, and offers wide scope for experience and training. The appointment carries certain duties at the Maternity Hospital. Salary and conditions of service in accordance with Whitley Council Agreements.

Applications, together with the names of 3 referees, should be lodged with the Surgeon-Superintendent, not later than 15th May.

WEYMOUTH AND DISTRICT HOSPITAL. (124 Beds.) CASUALTY OFFICER (Senior House Officer grade) required for approximately 5 months.

Applications, stating age, qualifications, nationality, and experience, together with copy testimonials, to Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

WHITEHAVEN HOSPITAL, Cumberland. (119 Beds, pre-registration post, recognised F.R.C.S.(Ed.).) HOUSE SURGEON (first, second, or Senior House Officer post). Vacant beginning of April.

Detailed applications with dates, and names of 2 referees, to Secretary, Workington Infirmary, Cumberland.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (327 Beds.) HOUSE SURGEON (post recognised by Royal College of Surgeons) required for general surgery with some E.N.T. duties. Approved pre-registration post. Vacant immediately.

Applications, with copies of 2 testimonials, to Group Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House PHYSICIAN required, Male or Female, for post vacant 18th May. Pre-registration post.

Applications, stating age, qualifications with dates, nationality, and copies of 3 recent testimonials, to Secretary, as soon as possible.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An associated hospital of the Birmingham University Medical School.) SENIOR HOUSE OFFICER (general surgery). Post vacant immediately.

Apply, giving age and qualifications, with copies of 2 testimonials, to the Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An associated hospital of the Birmingham University Medical School.) ORTHOPÆDIC SENIOR HOUSE SURGEON for Fracture and Orthopædic Department. Post recognised for F.R.C.S. Vacant immediately.

Apply, with 2 testimonials, to the Secretary.

WORCESTER (near). POWICK HOSPITAL. Locum SENIOR HOUSE OFFICER required for several months.

Applications, with copies of testimonials, to Medical Superintendent.

WORKINGTON INFIRMARY, Cumberland. (155 Beds, pre-registration post, recognised F.R.C.S.(Ed.).) HOUSE SURGEON (first, second or Senior House Officer post).

Detailed applications with dates, and names of 2 referees, to Secretary.

CHANNEL ISLANDS, JERSEY. GENERAL HOSPITAL. Applications are invited for the post of CASUALTY OFFICER which will be vacant on 1st June, 1958. The appointment is for 12 months, but is renewable for a further 12 months. Salary £850 p.a. less £125 p.a. for residential emoluments.

Applications to be submitted not later than 12th April, 1958, to the President, Public Health Committee, General Hospital, Jersey, C.I.

CANADA. GRACE HOSPITAL, Winnipeg, Manitoba, CANADA, has vacancies for RESIDENCIES and SENIOR INTERNSHIPS. Salary $200 per month plus maintenance. Uniforms and laundry provided. Grace Hospital is an active general hospital of 230 Beds with approximately 9128 discharges per year. Consideration may be given towards financial assistance with passage.

Applicants with credentials are invited.

CANADA. VICTORIA HOSPITAL, London, Ontario, CANADA. 800-Bedded Hospital associated with Medical School has vacancies for JUNIOR ROTATING INTERNS on or about 15th June, 1958. Approved training by Royal College for 10 specialties. Appointment 1 year with honorarium of $100 per month. Room, board, and laundry provided.

Applications, with letters of reference, to Superintendent.

MICHIGAN, U.S.A. OAKWOOD HOSPITAL, Dearborn, MICHIGAN. Applications are invited for 1 year approved ROTATING INTERNSHIP beginning 1st July, 1958. 234-Bed General Hospital 10 miles from Detroit. Excellent facilities. Hospital approved for exchange-visitor programme. Salary $200 if single, $250 if married. Housing rent-free.

Apply Director.

U.S.A. BRIDGEPORT HOSPITAL, Bridgeport, Connecti-CUT. Approved ROTATING INTERNSHIPS and RESIDENCIES available in a general hospital of 387 Beds and 60 Bassinets. Stipend of $190 per month in addition to full maintenance and uniforms. Exchange Visitor Program participant.

Address inquiries to: Chairman, Committee on Medical Education, Bridgeport Hospital, Bridgeport 10, Connecticut, U.S.A.

U.S.A. NORTON MEMORIAL INFIRMARY, Louisville, KENTUCKY, U.S.A. A 290-Bed general hospital, approved by the American Medical Association for ROTATING INTERNSHIPS of 1-year duration. Approved under Exchange Visitor Program. Only graduates from approved medical schools considered. Rotating services in medicine, surgery, obstetrics and pædiatrics. Stipend $200 per month, and full maintenance for bachelors.

Apply airmail to Administrator.

U.S.A. UNIVERSITY OF MINNESOTA MEDICAL CENTER. ANESTHESIOLOGY RESIDENCIES at the above Center. 2 or 3-year programme with clinical and didactic instruction in all phases of anæsthesia. Board approval. Positions starting every month.

Address, F. H. VANBERGEN, M.D., University of Minnesota Medical Center, Minneapolis 14, Minnesota.

Public Appointments

CENTRAL ELECTRICITY GENERATING BOARD. Chief Nuclear Health and Safety Officer. The Central Electricity Generating Board already have in hand the erection of 3 Nuclear Generating Stations, scheduled for completion in 1960–62, and thereafter plan to complete 6 additional Nuclear Stations in the succeeding 5 years. The health and safety of the workers and everyone living in the vicinity of the stations will be a matter of paramount importance, and the Generating Board are planning to build up a small team of Scientists and Doctors who will be charged with the responsibilities of seeing that the health and safety organisation in the Power Stations is adequate, of giving these organisations functional guidance and of seeing that operating manuals are prepared and followed. The Generating Board, therefore, invite applications for the appointment of CHIEF NUCLEAR HEALTH AND SAFETY OFFICER. Applicants should originally have been trained as physicists, physical chemists or in medicine, and must have experience of industrial management including experience of control of hazard in operations which involve potential dangers. The salary for the appointment will be within the range of £4000–£5000 p.a., depending upon qualifications and experience.

Applications should be forwarded under confidential cover to the Deputy Chairman, Central Electricity Generating Board, Bankside House, Sumner-street, London, S.E.1, in order to reach this address not later than 14th April, 1958, and the envelope should be clearly marked "Chief Nuclear Health and Safety Officer," quoting L/89A.

BIRMINGHAM. CITY OF BIRMINGHAM. Public HEALTH DEPARTMENT. Applications are invited for the temporary appointment of 3 Whole-time MEDICAL OFFICERS in the Maternity and Child Welfare Department to take holiday duty during the summer months, commencing early in May, 1958. The appointments are non-resident and the salary offered is at the rate of £20 2s. 9d. per week. Successful applicants expected to remain, if required, for a period of 6 months.

Application forms obtainable from the Medical Officer of Health, Council House, Birmingham, 3. Completed forms to be returned to him, with copies of 3 testimonials, not later than 16th April, 1958.

COMHAIRLE CONNDAE NA MIDHE. The Meath County Council invite applications for the position of Whole-time RESIDENT MEDICAL OFFICER at Our Lady's Hospital, An Uaimh. The appointment, which will be subject to sanction by the Minister for Health, will be for a period not exceeding 6 months. Rate of remuneration as approved by the Department of Health with rations and apartments.

Completed applications on the prescribed forms which may be had from the Chief Officer, Health and Assistance Sections, Meath County Council, An Uaimh, must be received not later than 5 P.M. on Wednesday, 16th April, 1958.

BUCKINGHAMSHIRE. COUNTY OF BUCKINGHAMSHIRE. BOROUGH OF SLOUGH. Applications are invited from registered medical practitioners for the Whole-time joint appointment of DEPUTY MEDICAL OFFICER OF HEALTH for the Borough of Slough, AND ASSISTANT COUNTY MEDICAL OFFICER AND SCHOOL MEDICAL OFFICER for the Buckinghamshire County Council. Salary within the scale of £1099 9s. 5d.–£1515 9s. 11d. Travelling and subsistence allowances will be paid on the appropriate scale. The appointment is superannuable and subject to medical examination.

Further particulars and forms of application may be obtained from the County Medical Officer, County Offices, Aylesbury, to whom completed applications must be delivered by 24th April, 1958.

R. E. MILLARD,
Clerk of the Buckinghamshire County Council.

March, 1958. N. T. BERRY, Town Clerk, Slough.

MIDDLESBROUGH COUNTY BOROUGH. School MEDICAL OFFICER AND ASSISTANT MEDICAL OFFICER OF HEALTH. Applications invited for this whole-time, superannuable post. Salary on national scale. Duties chiefly in School Health Service, but there will be opportunity of experience in Health Department. Post is suitable for doctor wishing to start a career in public health.

Particulars and application forms from Director of Education, Education Office, Woodlands-road, Middlesbrough, to whom completed forms should be returned as soon as possible.

TREASURY MEDICAL SERVICE. Applications are invited from medical practitioners, practising in the districts detailed below, for appointment, in a part-time and mainly advisory capacity, as LOCAL TREASURY MEDICAL OFFICER for each of the places or groups of places shown. The town shown in parentheses after the place-names indicates the Head Post Office Area in which the place, or group of places, is situated. Successful applicants will be required to examine and report on the condition of certain Government Officers, teachers, candidates for appointment, &c., who may be referred to them from time to time; and to attend when summoned to an emergency case of accident or sudden illness occurring in a Government office in the neighbourhood. Fees for this work, and mileage allowance where necessary, will be paid on a scale agreed with the British Medical Association.

Intending applicants should write, within 14 days, to: Treasury Medical Adviser, Treasury Chambers, Whitehall, S.W.1, for a form on which application may be made. Applicants should be not more than 60 years of age.

The places for which applications are invited are as follows:—

ENGLAND AND WALES

Shipley (Bradford).
Isleworth (Hounslow).
London, N.7 (Holloway).
Llansantffraid (Oswestry).
Par (St. Austell).
Bolsover (Chesterfield).
Crewkerne (Yeovil).
Batley (Dewsbury).

SCOTLAND

Banff, King Edward and Macduff (Banff).
Duns (Duns).
Dunblane (Stirling).

WALSALL. COUNTY BOROUGH OF WALSALL. Applications are invited from registered medical practitioners for the post of ASSISTANT MEDICAL OFFICER OF HEALTH. Salary scale £1050–£1475 p.a. The commencing salary will be decided according to qualifications and experience. Possession of the D.P.H. or D.C.H. will be considered an advantage.

Further particulars and application forms may be obtained from me.

W. STALEY BROOKES, Town Clerk.

Council House, Walsall.

WARWICKSHIRE COUNTY COUNCIL AND BOROUGH OF NUNEATON, BEDWORTH URBAN DISTRICT AND ATHERSTONE RURAL DISTRICT. ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH AND DEPUTY MEDICAL OFFICER OF HEALTH. Applications are invited from duly qualified medical practitioners for the post of Assistant County Medical Officer of Health with the Warwickshire County Council, and the successful candidate will also be appointed Deputy Medical Officer of Health for the Borough of Nuneaton, the Bedworth Urban District, and the Atherstone Rural District, which posts together constitute a whole-time appointment, the time being allocated equally between County Council and County District Council duties. The officer appointed must hold the Diploma in Public Health. The aggregate salary will be £1396 5s. p.a., rising to a maximum of £1796 17s. 6d. p.a. Consideration will be given to the granting of financial assistance towards removal expenses.

Conditions of appointment and forms of application may be obtained from the County Medical Officer of Health, Shire Hall, Warwick, by whom completed forms of application must be received not later than 26th April, 1958.

L. EDGAR STEPHENS,
Clerk of the County Council.
A. A. CRABTREE,
Town Clerk, Nuneaton.
S. G. DEEMING,
Clerk of the Bedworth Urban District Council.
G. CARLYON MAY,
Clerk of the Atherstone Rural District Council.

Shire Hall, Warwick, March, 1958.

GOVERNMENT OF THE FEDERATION OF RHODESIA AND NYASALAND. Vacancies: RADIOLOGISTS—Ministry of Health.

Duties: Radiodiagnosis and many include the training of Radiographers for the M.S.R. Diploma.

Salary: At present £2350 p.a. fixed, but will be increased to £2450 p.a. fixed with effect from 1st July, 1958. Senior posts on a fixed salary of £2750 p.a. exist, and these are normally filled by promotion from within the service.

Application forms and further details from the Secretary (R), Rhodesia House, 429, Strand, London, W.C.2. Closing date 9th May.

General Practice

For an **Executive Council post** *(England and Wales) apply on form* E.C.16A *obtainable from the council. Mark envelope "Vacancy."*

ESKBANK, MIDLOTHIAN. Applications are invited from registered medical practitioners to fill a single-handed VACANCY in the Dalkeith/Eskbank district, which has arisen on account of death. The number of patients on the list is presently 733. Part of the deceased doctor's house, including the surgery and waiting room, may be available to purchase or rent by private arrangement.

Applications, stating age, qualifications and experience, and the names of 2 persons to whom reference may be made, should be sent within 7 days of the appearance of this advertisement to the Clerk, Lothians and Peebles Executive Council, 25, Stafford-street, Edinburgh, 3.

SALFORD (Higher Broughton), LANCASHIRE. Retirement VACANCY. Urban. Doctor emigrating. List 1943 (1st January, 1958). Residence, including surgery, available for sale to successor. Applications on Form E.C.16A to reach undersigned not later than 12th April, 1958.

J. S. G. CLOUGH, F.C.I.I.,
Clerk, Salford Executive Council.

Irwell-place, Crescent, Salford, 5.

SOUTH SHIELDS. Applications are invited for Vacancy. Urban—list at present approximately 1700. Surgeries (2) may be available but not residence. Apply on E.C.16A to undersigned before 11th April, 1958.

A. WALLER, Clerk of the Executive Council.

2, Keppel-street, South Shields, Co. Durham.

Trainee Assistant. Applications invited for Vacancy in South Coast town.—Address, No. 387, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Miscellaneous

Applications are invited for the appointment of a Medical Officer with a leading British Company in British West Africa. Applicants should not be more than 35 years of age and should have had good all-round experience since qualifying. Salary will be in accordance with age, experience and qualifications, but will not be less than £1600 p.a. In addition there are family allowances, free passages to and from West Africa, and free furnished quarters. Membership of pension fund is compulsory. Tours of duty will be about 18 months followed by leave on full pay.

Applications, giving full details of experience, should be made to the Principal Medical Officer, Unilever House, Blackfriars, London, E.C.4.

A large Pharmaceutical Company requires in their Medical Department the full-time services of a Medical Practitioner (Male), age between 30 and 40 years. Preferably with a higher medical qualification and experience as Medical Registrar. The duties of this position will be primarily those of initiating and progressing clinical research investigations, although some general professional advisory work may be required. The successful applicant must be prepared to do a certain amount of travel both in the United Kingdom and abroad. Minimum salary £1750. The Company operates a non-contributory pension scheme.—Write, with fullest details, to Address No. 388, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Medical Officers required by Falkland Islands Dependencies Survey for tour of 30 months in Antarctic bases. Unique opportunity for research on polar physiology; suitable candidates will be given research training at Division of Human Physiology, National Institute for Medical Research, London. To leave United Kingdom October, 1958. Salary £625 a year. Free passages, quarters, messing, and canteen stores. Liberal leave on full salary. Candidates must possess qualifications registrable in United Kingdom. Write to the Crown Agents, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications, and experience, and quote M3C/44633/LD.

Experienced Typist desires work to do at home. Moderate prices.—K. STRANGE, 131c, Victoria-way, S.E.7.

Doctors requiring applications, theses copied: Write to MANTON (WESTMINSTER) LTD., 98, Victoria-street, S.W.1 (VIC. 0141), who are specialists.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimens of urine and £2 2s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Microscopes. Highest prices paid for good modern types. Send or bring your equipment for valuation.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

Continental Holidays not mass produced. If you dislike group travel you will find our prices and personal service just what you want. Brochure from: BUSINESS AND HOLIDAY TRAVEL LTD., Grand Buildings, Trafalgar-square, London, W.C.2. WHItehall 4114.

Typewriting and Duplicating. First-class work at moderate prices by experienced medical typists. Electric machines. —SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM 5329/0504).

Old medical and scientific books, pictures, manuscript notebooks, letters, &c., wanted by a collector.—Address, No. 343, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Expert medico-legal photographic service. Accident, injury, claims. Any location.—Address, No. 370, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2, or PEGGY DELIUS, WEL. 7788.

For Sale. Operating-theatre table and accessories, theatre light, &c. Offers invited.—Apply, Dr. HAYES, 47, Norfolk-road, Maidenhead, Berkshire. Phone Maidenhead 3232.

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NATURAL VITAMIN B COMPLEX EXTRACT	2 grammes

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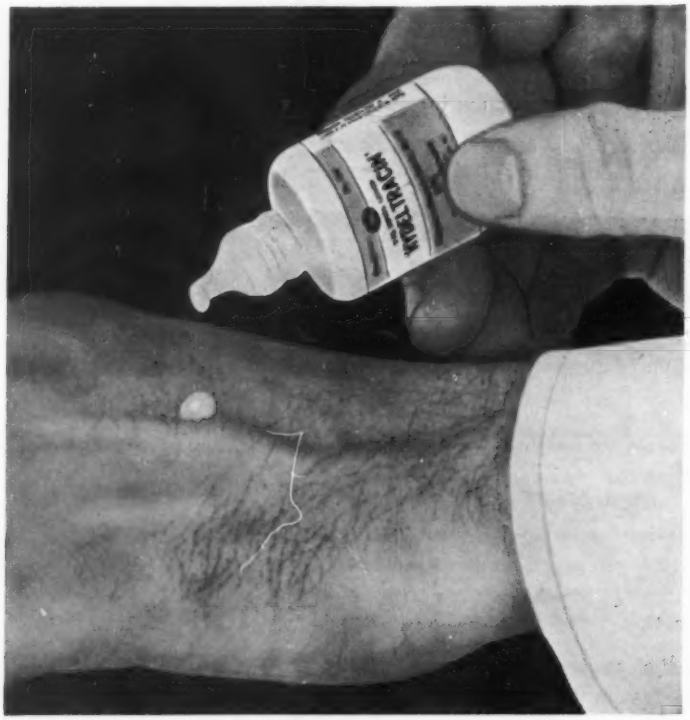

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